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Journal of Educational Research

OFFICIAL ORGAN OF THE
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JOURNAL *of* EDUCATIONAL RESEARCH

Volume VIII OCTOBER, 1923 Number 3

HOW AN INSTRUCTIONAL RESEARCH DEPARTMENT CAN ASSIST TEACHERS[1]

P. T. RANKIN
Research Department, Detroit Public Schools

In a number of phases of education, a general policy is becoming more and more common. A city board of education settles upon a definite policy as to types of schools, as to the required amount of teacher preparation, as to expenditures which are legitimate for a school to make. Such general policies assure within the system a large degree of unity, with its attendant advantages. Furthermore, the mere statement of policies clarifies thinking, tends to eliminate personal bias from supervisory criticism, and stimulates those who attempt to formulate better policies.

Instructional research, like other parts of the school system, must be in accord with a well-defined and adequate policy. The following might be taken as an acceptable basic policy: Instructional research is to make the educational process more effective through aiding (1) the pupil in his classroom learning activity, (2) the teacher in her classroom assisting activity, and (3) the supervisory and administrative officers in their solution of the larger instructional problems.

First, since growth by pupils is the heart of instruction, effectual instructional research should operate to accelerate this growth. Second, an instructional research department should aid the teacher in her capacity as assistant. She needs information about the pupil in order to assist and guide him properly. She needs to know how much a child with his equipment is usually able to accomplish. Measuring sticks can be extremely valu-

[1] Read before the Educational Research Association, Cleveland, February 28, 1923.

able to her in this connection. Third, there are in every school system major problems of instructional methods and administration which must be answered. One task, therefore, of the instructional research department is to provide the data which will serve as a basis for the scientific solution of these problems.

Consideration of this policy brings to light several principles consonant with this program for instructional research. If the policy is accepted, these principles follow logically as more specific statements of its implications.

1. *The teacher measures in order to help herself and her pupils.*—What motive should prompt the teacher to give educational tests? Under ideal conditions the motive can be none other than the teacher's conviction of the value of tests in her teaching, indicated by her whole-hearted use of them as aids to her and to the children in her care. When this is the case the teacher will insist on personally carrying through the entire testing procedure. She will give the tests, score them, tabulate them, and interpret the scores; and as a result of the whole process she will be able to teach more effectively. The survey test, given and handled by an outsider, can be of little service within the classroom. Teachers with vision should carry on the educational testing[2] that is done for the purpose of improving instruction.

2. *Testing is most effective when voluntary.*—What is the ideal basis of distribution of tests? Again the answer is to be sought with reference to the teacher. The best results will be secured when testing material is furnished to teachers only in response to their expressed wishes. That is, ideally the testing program should be on a voluntary basis. Tests will be of the largest service to the teacher who uses them because she is convinced of their value, and because she believes that the time spent in testing activity will yield richer returns in children's growth than an equal amount of time spent in any other single activity.

Detroit's testing program, after having been only technically voluntary since its inception nine years ago, was put on a strictly

[2] In this paper the term "tests" refers to standardized tests of educational accomplishment rather than to tests of native capacity.

voluntary basis for the current year.[3] As far as can be judged, the attitude towards tests and their use has improved immensely as a result of this step. Testing material is being used more and more like other instructional supplies, that is, as a means to an end, and not as an end in itself. In the main, only those teachers who are awake to the possibilities of measurement are asking for testing material; such teachers make effective use of it.

A comparison of the amount of testing in Detroit on the voluntary basis with that on the general basis may be interesting. Of the 143 elementary schools using tests last year 136 schools, or 95 percent, are continuing the testing program to a greater or less degree. Approximately 1,700 elementary-school teachers sent in requests for testing material this year. The total number of test forms supplied on the two initial tests in arithmetic, geography, reading, and penmanship this year was 421,000, almost as great as the corresponding number for last year, 426,000. It is evident that placing the testing program on a voluntary basis does not greatly decrease the volume of testing, and the effect of the change on the attitude of teachers is apparent to all who are in close contact with the situation. *Voluntary testing works.*

3. *The interchange of teachers' ideas on the uses of tests is important.*—After preliminary courses acquainting teachers with the general outlines of educational measurement, further teacher training will come largely through the interchange of ideas between teachers. Teachers who are directly using tests as aids are the people best qualified to select and explain to other teachers the most effective methods of diagnosis, interpretation, and use. The function of the instructional research department in this connection is to provide means for spreading among teachers those helps in interpretation which are found to be most effectual. In Detroit this is being done in several ways. First, the more evident forms of diagnosis and interpretation are suggested in the manual of instructions. Second, a series of meetings open

[3] This article was written last year. The "current year" is therefore the school year 1922-23.—*Editor.*

to all teachers was organized at each of which several selected teachers described how they had used the results of tests to improve their teaching. These meetings were well attended, and seem to have been of considerable value in increasing teachers' acquaintance with procedure after testing. Third, the department is now collecting a number of the specific uses to which competent teachers put their tests results, and intends next year to publish a bulletin containing these statements with the teachers' signatures.

4. *Standard tests should be constructed by experts.*—The term "experts," as used here, includes three different groups within the school system: (1) supervisors who are especially qualified in the field of knowledge tested, (2) research workers who are specialists in test construction, and (3) especially competent teachers. The inclusion of teachers here may be questioned. I defend it partly on the basis of the general presupposition that teachers are the ones who will use the tests, and that, therefore, they should have a share in their construction, and partly on the basis of the very real contribution which can be made by capable teachers, due to their close relation to children and to the teaching process. If these three groups work in conjunction, the tests produced are certain to be better than those produced by any single group.

5. *Tests should fit objectives.*—Satisfactory tests must measure the degree of attainment of the objectives outlined for the branch of instruction tested. Ideally, measures should be provided for determining the degree to which all important objectives have been reached. Certainly the tests used must test desired products, for what is tested will be taught.

6. *Tests should be used for a variety of purposes.*—The testing program should provide for three kinds of tests each term: inventory, diagnostic, and appraisal. At the beginning of the term an initial test should be given to inventory the abilities in the class. The results serve as a basis for the teaching program, (1) because they reveal the main sorts of difficulties for the whole class, and (2) because the children's scores make

possible a rough classification into more homogeneous groups for instructional purposes. For example, in the Detroit spelling tests, pupils who miss one word or none on the initial test make up the "A" group, those who miss two to seven words the "B" group, and those who miss eight to twenty-five words the "C" group. A rather definite procedure has been devised to carry on this group scheme of instruction, and the results indicate that it is unusually effective.

Early in the term supplementary tests—so-called diagnostic tests—also should be given to aid the pupil and the teacher to determine the causes of difficulty. For example, in the field of English composition, these tests may take the form of measures like the Briggs English Form Test[4] or the Wilson Language Error Test.[5] The general test used for inventory purposes may also often be used as an aid in diagnosis.

Finally, there must be a test or a series of tests that will enable the child to appraise his growth during the term, that will enable the teacher to evaluate her effectiveness, and that will make possible a knowledge of the product of the whole system.

7. *The mechanics of tests should be simple, brief, and uniform.*—Allow me to relate a little personal experience in connection with this point. Last year, my first year in Detroit, I thought it well to secure some first-hand information on the Detroit testing program from the teacher's standpoint. I went into a school as a regular substitute and taught a fourth-grade class for two weeks, "testing week" and the week just preceding. I kept an accurate record of the use of my time on the tests. I discovered that of the time I had available for the tests I spent most in *obtaining* the results and very little in their interpretation and use. This suggested that perhaps a disproportionate amount of time was being spent generally on the mechanics of giving, scoring, and tabulating the tests. Consequently, at the time of the February initial test, I attempted to find out how the teachers in

[4] Briggs, T. H. English Form Test. New York: Teachers College, Columbia University, 1920.

[5] Wilson, Guy M. Language Error Test. Yonkers: World Book Company, 1923.

four schools distributed the time which they devoted to the use of the standard tests. The results appear in Table I.

TABLE I. DISTRIBUTION OF TIME DEVOTED TO TESTING
(Medians for 64 Teachers)

Subjects	Total Minutes	Minutes on Interpretation	Minutes on Mechanics	Percent on Mechanics
Arithmetic	122	83	39	32
Composition	151	47	104	69
Geography	143	70	73	51
Handwriting	121	33	88	73
Reading	114	55	59	52
Spelling	151	77	74	49
All	802	365	437	55

The first line of Table I is read as follows: The median amount of time devoted by teachers to the arithmetic test was 122 minutes, divided into 83 minutes on interpretation and use, and 39 minutes on the mechanics of obtaining the results; thus 32 percent of the total time was spent upon mechanics. The form of record which was used suggested several methods of interpretation, and for this reason I feel sure that the figures obtained indicate a much higher proportion of time spent on the use of the results than was actually true in the city at large. Nevertheless, as the table shows, the average proportion on mere mechanics was 55 percent of the total time used by these 64 teachers in connection with the initial test.

The scoring and tabulating of tests are not of themselves valuable; they serve only as a basis for the interpretation and use of the results. The time spent upon the mechanics of tests must be reduced as far as possible in order that the maximum time may be devoted to the more worth-while study of the results. That is, if we assume a constant time available for testing procedure, the time for mechanics must be decreased if the time for interpretation is to be increased. I am not recommending less time on testing; I do urge a better distribution of that time. If a teacher can spend four hours on a certain test, greater benefit

is to be expected from three hours' than from one hour's study of the results. But this requires a decrease in the time spent in *obtaining* these results, that is, in the mechanics of the process.

Uniformity in the form of record and report for different tests is probably the most feasible single method of improving the situation as to mechanics. It should be unnecessary for a teacher to record the results of a composition test on one form of sheet and those of an arithmetic test on a totally different one. Some uniform scheme for reporting test results should be adopted and adhered to within a given system. Such schemes are suggested as the expression of scores in terms of test ages, (e.g. a Monroe reasoning test age of 11 years 4 months), the McCall T-score, and the point score used in Detroit.

Illusrations of the Detroit class record sheets for obtaining the point scores in spelling and in writing are given in Figures 1 and 2.

Note the similarity in makeup of the record sheets for two tests which differ as materially as these tests must. A teacher in Detroit who learns to tabulate spelling test scores has control over the method of tabulation of test scores in the other subjects. Some such universal form of record is desirable as a time saver for more important activities. The mechanical phases of testing must be simple and not too time-consuming.

This phase of the testing program may also be improved by teacher revision of the testing material and instructions. This year we obtained the reactions of a number of Detroit teachers to test forms, record sheets, instructions, suggestions for interpretation—in fact, to all the testing material. Several especially capable teachers worked full time daily for several weeks on the revision of the testing supplies in order that they might be better adapted to teachers' use. Such modifications by members of the teaching force are essential to a well arranged program.

8. *The pupil is the prime beneficiary.*—In many classrooms today the main user of the test results is the pupil, and everywhere there is a growing tendency towards this use of measurement by the children themselves. The Detroit instructional pol-

Tabulation _____

Detroit Public Schools
Department of Educational Research

Number

Spelling Test, Class Record Sheet

Original: To be retained by teacher of Spelling.

School _____ Room _____

Examiner _____

Date _____ Test used: Form ____ Grade ____

Special conditions affecting the results _____

_____

Class Score: Points this test _____ Points previous test _____ Gain ____

City Scores: " " " _____ " " " _____ " _____

Scores tabulated by _____

		No.	%	Points
Scores Group I	Children of Standard Ability 0 mistakes, or perfect papers.		x 10	
Scores Group II	Children for whom regular work will furnish sufficient drill 1 2 3		x 9	
Scores Group III	Children in need of thorough drill 4 6 8 5 7 9		x 7	
Scores Group IV	Children who need special attention and extra drill 10 13 16 11 14 17 12 15 18		x 4	
Scores Group V	Children for whom some special adjustment of work must be made Record here all scores larger than those above.		x 0	0
	Totals			

Note. 12 means 12 words misspelled.
Record here all scores changed by retesting.

(Over)

FIGURE 1. DETROIT CLASS RECORD SHEET FOR SPELLING

Tabulation _____

Detroit Public Schools
Department of Educational Research

Number

Writing Test, Class Record Sheet

Duplicate: **To be returned to the department**

School _____ Room _____

Examiner _____ Grade _____

Date _____ Test used: Form _____

Special conditions affecting the results _____

Class Scores: Points this test _____ Points previous test _____ Gain _____

Results Correct _____ Notice of mistakes sent _____

Results checked by _____

Scores	Children of Standard Ability			No.	%	Points
Group I	Rate 65–84 Quality 80 or better	Rate 85–99 Quality 70 or better	Rate 100 or more Quality not less than 65		x 10	
Scores	Children for whom regular work will furnish sufficient drill					
Group II	Rate 55–74 Quality 70 or better	Rate 75–84 Quality 60 or better	Rate 85 or more Quality not less than 55		x 9	
Scores	Children in need of thorough drill					
Group III	Rate 45–64 Quality 55 or better	Rate 65–74 Quality 45 or better	Rate 75 or more Quality not less than 40		x 7	
Scores	Children who need special attention and extra drill					
Group IV	Rate 30–55 Quality 45 or better	Rate 55–64 Quality 30 or better	Rate 65 or more Quality not less than 25		x 4	
Scores	Children for whom some special adjustment of work must be made					
Group V	Rate less than 30 Whatever the quality	Rate 30–54 Quality 25–44	Quality below 25 Whatever the rate		x 0	0
			Total			

Note: Rate means letters per minute.
Quality means score by Ayres scale.
Record here all scores changed by retesting.

FIGURE 2. DETROIT CLASS RECORD SHEET FOR WRITING

icy recognizes the pupil as the center of the entire educational process. The whole testing and teaching program is ultimately for his benefit. Training should be provided for the *pupil* in order that he may understand the results in any test and may recognize their significance as applied to him personally.

In general, the pupil should know the degree of his ability at the term's beginning; on the basis of this self-knowledge he should be able to set a goal which is for him possible of attainment; he should determine the sources of his difficulties; with the assistance of the teacher he should work out ways of overcoming these difficulties; and finally he should be able to measure his progress towards the desired goal.

9. *Records of all tests should be available in the research department.*—Thus far the discussion has centered about the pupil or the teacher. The system as a whole must be considered as well. There are many major instructional and administrative problems whose solution depends upon the existence of quantitative data on classroom products. For this reason it is essential that copies of all test records be available in the research department. The Detroit program provides for securing copies of all individual record cards and class record cards, and those for the past five years are on file in the office of the department. More than being on file, these records are constantly used! Such studies as the continuous comparison of the effectiveness of the platoon and of the traditional types of schools would have been impossible were it not for these records.

10. *Reports on all tests should be sent from the research department to schools.*—But for efficient functioning of the research department reports must go both ways. Reports back to the schools are essential after every test or special experiment: the department, after study of the individual school reports, can return something of value to the teacher which will aid her in interpretation. The standard report commonly gives measures of achievement and of growth for the school contrasted with the corresponding measures for the city as a whole. Measures both of central tendency and of dispersion should be re-

ported. The most essential part of the report is a discussion of the city scores and of some suggestions for the interpretation and use of the scores within the school.

Graphic representations of such data are common. A specimen school graph in spelling is presented (Figure 3) as an illustration of the kind used in Detroit. The point score (the

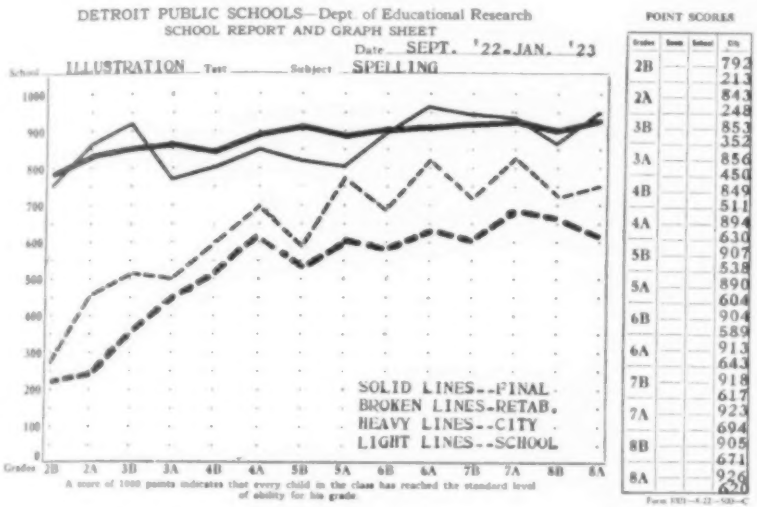
DETROIT PUBLIC SCHOOLS—Dept. of Educational Research
SCHOOL REPORT AND GRAPH SHEET
Date SEPT. '22-JAN. '23
ILLUSTRATION
SPELLING
SOLID LINES--FINAL
BROKEN LINES-RETAB.
HEAVY LINES--CITY
LIGHT LINES--SCHOOL
Grades 2B 2A 3B 3A 4B 4A 5B 5A 6B 6A 7B 7A 8B 8A
A score of 1000 points indicates that every child in the class has reached the standard level of ability for his grade.
POINT SCORES
2B 792 213
2A 843 248
3B 853 352
3A 856 450
4B 849 511
4A 894 630
5B 907 538
5A 890 604
6B 904 589
6A 913 643
7B 918 617
7A 923 694
8B 905 671
8A 926 620

FIGURE 3. SCHOOL REPORT AND GRAPH SHEET

measure of class achievement) is shown along the vertical axis and the grades along the horizontal. School scores are shown by the light lines and city scores by the heavy ones. Retabulation test scores (from the inventory test at the beginning of the semester) are represented by the broken line, final or appraisal test scores by the solid line. It is apparent that this school started higher than the city median, made less than the city gain, and ended the semester about even with the city median. This illustrates one of several forms of reports from the department to the schools.

11. *The efficiency of tests needs constant checking.*—The discussion can scarcely close without consideration of the effi-

ciency of tests, efficiency in the engineering sense of the ratio of output to input. Distinction must be made, however, between the efficiency of tests purely as measuring devices and their efficiency as instructional aids. In the latter case their efficiency should be continually compared with that of other helps to instruction. It may well be that there are others just as effective and more efficient: that is, others may produce as satisfactory results at a lower cost in time and money. The optimum degree to which tests may be used as instructional aids needs to be determined. The question of efficiency in this case is more important than that of effectiveness, and merits further study.

In the former case, however, tests as measuring instruments are unique and have no substitute. Although their use as direct instructional devices may increase or decrease, depending upon the discovery of more efficient devices, their use as measuring instruments can but increase. Measurement must remain to evaluate the results obtained by any method. The efficiency of one test as opposed to another may be questioned, but not the efficiency of tests as opposed to something else. To summarize the principle: as measuring instruments tests are unique and cannot be replaced; as instructional aids they should be restricted to fields where they are more efficient than other available devices.

Eleven principles which grow logically out of the basic policy as stated have been enunciated. In them all is the basic idea that tests shall make for greater efficiency in the learning process. The means suggested for improving the testing program have involved an increasing share for the teacher in preparing testing material and in determining its use. In fact the best answer to the question, "How can an instructional research department assist teachers?" must be sought, it seems, in a greater democratization of the testing program.

AN ANALYSIS OF MULTIPLICATION DRILL

F. B. KNIGHT
State University of Iowa

It is possible and practicable to make greater use of the psychology of learning in the construction of learning instruments, such as text books and syllabi, than is now ordinarily the case. One instance of this generalization is brought out through the analysis of material designed for specific drill in the multiplication of whole numbers. In studying current arithmetic texts one has frequent grounds for the following suspicions concerning material which is professedly general "drill."

(1) Quantity of drill material is all that is necessary. The inner construction of the content is of theoretical interest only.

(2) It is impossible or unimportant to construct drill material so that the specific connections will be exercised with a calculated frequency.

(3) Quality of drill is important only in the sense that skill in multiplication is not increased by addition drill as surely as it is by multiplication drill, but as far as the careful building of the multiplication drill itself is concerned, suspicion (1) is pertinent.

(4) It is very doubtful if many authors of drill material have carefully analyzed their work to see just what practice has been provided; or in the event of such analysis, the prime facts of the psychology of drill have often been either unknown or judged too insignificant to affect practice.

Contrary to the attitude implied in the above four suspicions, it is well known that scrupulous observance of the law of exercise and its corollaries is both possible and wise. We offer here samples of two sets of multiplication drill exercises which, to the casual observer, *look* equivalent. The analysis of these two sets of drills will reveal the fact that they are quite different in that they give to the pupil a radically different kind of experience in the function of "multiplication of whole numbers by whole num-

bers." This difference is not in the total amount of practice; it lies in the quality or distribution of practice.

Set A is the first twenty-one multiplications of a drill exercise from a current textbook which features its drill character. Set B is an exercise handed to the writer by one of his students, Mr. J. H. Boatman, in response to this class assignment: "Construct a drill in some arithmetical process which is observant of the Law of Exercise." Samples of Set A and Set B are here presented.

SET A

789×625	52×3347
342×924	39×5092
802×906	84×2425

SET B

203	456	795	958×97
542	432	786	654×9
			789×99

Set A is slightly better than Set B in *amount* of practice given, although each represents a rather heavy arithmetic assignment for a fifth or sixth grade. Set A has a total of 73 digits in the multiplicands. Set B has a total of 58 digits in the multiplicands. Set A has a total of 53 digits in the multipliers. Set B also has a total of 53 digits in the multipliers.

The following analysis considers these two sets of drill from different aspects, all of importance in that they concern the pupil's experience with the function concerned.

1. *The multipliers.*—Table I gives a distribution of the digits of the multipliers for each set. Neglecting the zeros, for they seem to possess a special difficulty in multiplication, we find that there is practically no relation between the size of a digit and the frequency with which it appears as a multiplier in Set A. In Set B the larger digits are practiced the most frequently. Correlating by rank order (Spearman) the ρ between the size of digit and the frequency of its appearance in Set A is plus 0.19. In Set B the ρ is plus 0.89.

2. *The multiplicands.*—In Table II a distribution of the digits of the multiplicands of Sets A and B is given. By rank order, the ρ between the size of the digits and the frequency of

TABLE I. FREQUENCY OF THE DIGITS IN THE MULTIPLIERS

Digits	Frequency	
	Set A	Set B
0	3	4
1	4	4
2	4	4
3	7	4
4	7	4
5	3	4
6	10	6
7	2	8
8	8	7
9	5	8

their use in the multiplicands of Set A is plus 0.10, of Set B, plus 0.94.

Set A is built on no evident theory in respect to any relationships between the significance of drill and the distribution of frequencies of the digits printed. Set B is built on the theory that the larger digits should be printed the oftener. It does not follow that Set B is thereby superior unless it be true that the larger digits, for one reason or another, need to be considered more frequently if they are to be mastered as well as the smaller digits are mastered.

TABLE II. FREQUENCY OF THE DIGITS IN THE MULTIPLICANDS

Digits	Frequency	
	Set A	Set B
0	6	3
1	2	4
2	10	4
3	10	4
4	7	5
5	5	5
6	11	5
7	9	8
8	10	7
9	3	8

3. *Amount of drill on each combination.*—Table III gives the frequency with which the different multiplication combinations receive practice in Set A; Table IV, the same for Set B. The column denotes the digits of the multipliers, the row those of the multiplicands. The number in each box denotes the frequency with which the combinations received practice.

It is obvious from inspection that the relation between the size of the digits and the frequency with which the several digits are used as multipliers or as multiplicands is practically a chance one in Set A. In Set B this relation is exceedingly close.

In Set A, 30 of the 100 possible multiplication combinations receive no practice at all; and 23 of these 30 have as multiplier and multiplicand some number other than zero. In Set B, every combination is practiced at least once. The average product of all the combinations omitted in Set A is 17.

In Set A, 21 percent and in Set B, 46 percent of the practice goes to the combinations between 6×6 and 9×9, inclusive. The 16 largest combinations having as both multiplier and multiplicand 6, 7, 8, or 9 are probably by all odds the hardest part of the multiplication table. If this is true, Set A falls far short of giving proper practice since three of the combinations in that part are not practiced at all, and since only 21 percent of the total practice is given to that section. In Set B, on the other hand, all these combinations are practiced, and 46 percent of the total practice is put upon this harder section.

In a general drill in multiplication for the fifth grade, omission of such combinations as 1×2, 2×1, 4×2, etc., might be condoned. Even a canny book agent, however, could not defend these isolated facts true of Set A.

6×6 is practiced 10 times, but
7×7 is not practiced at all
7×9 is not practiced at all
9×9 is not practiced at all

There is no defense for practicing 8×3 six times and 7×3 no times, nor for practicing 8×5 five times and 7×5 no times.

4. *The kind of practice given to "carrying."*—Analysis of children's mistakes in multiplication often reveals two favorite errors. They do not carry when they ought to, or they carry *one* when they should carry some other amount. Explanation for the second error is probably found in the kind of carrying drill given in Set A. In this drill, whenever carrying is to be done, it usually means carry *one*, so in subsequent practice to

TABLE III. FREQUENCY OF APPEARANCE OF COMBINATIONS IN SET A

	1	2	3	4	5	6	7	8	9	0	Total
1	0	0	4	4	2	3	1	0	0	0	14
2	0	2	2	3	1	1	1	2	0	1	13
3	2	4	2	0	2	0	3	6	2	4	25
4	0	4	6	3	4	3	3	0	0	0	23
5	1	2	0	0	0	1	3	2	2	0	11
6	0	3	1	2	1	10	4	6	1	5	33
7	0	1	0	2	0	3	0	1	0	0	7
8	1	5	6	1	5	2	1	2	1	1	25
9	0	3	4	1	0	1	2	4	0	3	18
0	0	2	1	0	0	1	1	2	1	1	9
Total	4	26	26	16	15	25	19	25	7	15	178

TABLE IV. FREQUENCY OF APPEARANCE OF COMBINATIONS IN SET B

	1	2	3	4	5	6	7	8	9	0	Total
1	1	1	1	1	1	1	1	1	1	1	10
2	1	1	1	1	1	1	1	1	1	1	10
3	1	1	1	1	1	1	2	1	2	1	12
4	1	1	1	1	1	1	2	1	2	1	12
5	1	1	1	1	1	1	2	1	2	1	12
6	1	1	1	1	1	1	4	3	4	1	18
7	1	1	1	1	2	2	5	5	5	1	24
8	1	1	1	1	1	2	5	3	4	2	21
9	1	1	1	1	2	2	5	5	5	1	24
0	1	1	1	1	1	1	1	1	1	1	10
Total	10	10	10	10	12	13	28	22	27	11	153

carry *one* is not an unnatural response to the situation "I must carry in this instance." Set B, as shown in Table V, does not practice the carrying of one as opposed to the carrying of other digits. The "carrying" practice is associated with all digits with reasonable impartiality. In Set A, 62 percent of the carrying is with 0 or 1; in Set B only 29 percent of the carrying is with 0 or 1.

TABLE V. NUMBER OF TIMES EACH DIGIT IS "CARRIED"

Digit Carried	Frequency	
	Set A	Set B
0	38*	15
1	55	11
2	23	11
3	12	8
4	13	10
5	5	12
6	1	9
7	2	8
8	1	7

* 38 of the multiplications involve no carrying.

5. *Addition difficulties concealed in "carrying."*—To carry 3 in the example 27×5 may be inherently more easy than to carry 3 in the example 24×9. In the first instance the carrying involves 10 plus 3 equals 13, and in the second instance it involves 18 plus 3 equals 21. To go, in mental addition, from tens to twenties or to change from one decile to another involves the changing of two figures, e.g., *18* plus 3 equals *21*. On the other hand, to stay within a decile involves the changing of but one figure, e.g., *10* plus 3 equals *13*. Call this changing of both figures in addition "stepping up" to a higher decile. It is reasonable to suppose that if two sets of drill material are exactly equal in all respects except that one set provides a wide experience with "stepping up" and the other does not, the sets are really materially different, and the one which provides more extensive stepping up practice is the better. An analysis of the two sets of drill under consideration reveals the facts given in Table VI. Without arguing too earnestly for want of validated

TABLE VI. DISTRIBUTION OF "STEPPING UP" TO HIGHER DECILES IN CARRYING

Step	Frequency	
	Set A	Set B
From 10's to 20's	2	1
" 20's to 30's	6	4
" 30's to 40's	2	2
" 40's to 50's	3	10
" 50's to 60's	0	7
" 60's to 70's	0	7
" 70's to 80's	0	3
Total	13	34

data as to which set of drills is the better, it is pertinent to note that the drills are by no means equivalent in the amount and kind of "stepping up" practice provided.

6. *Provision for practice in addition.*—While these two sets of drills are for multiplication, it is also germane to the general topic to analyze them for the amount and kind of addition of the partial products. The facts are reported in Table VII.

TABLE VII. DISTRIBUTION OF ADDITION COMBINATIONS

	1	2	3	4	5	6	7	8	9	0	
1	5	11	3	15	4	7	6	4	3	10	A
	4	11	12	3	8	4	8	8	3	1	B
2		7	6	6	4	7	2	5	1	7	A
		0	2	5	12	3	2	5	1	2	B
3			1	2	5	7	1	6	0	3	A
			3	7	5	2	3	7	0	4	B
4				2	7	7	2	5	2	7	A
				2	2	6	5	1	0	3	B
5					3	2	2	3	0	3	A
					2	2	3	5	1	0	B
6						1	1	0	1	2	A
						5	3	2	4	1	B
7							1	2	0	1	A
							0	2	0	2	B
8								3	0	3	A
								0	0	1	B
9									0	3	A
									0	2	B

The upper number in each box is the frequency of practice provided by Set A. The lower number is the frequency of practice supplied by Set B. The table neglects the order of the addition, i.e., 7 plus 4 is reported as 4 plus 7. The carrying of zero is also neglected. The column headings represent one addend, the row headings the other addend. Important addition combinations not practiced by Set B but practiced by Set A are 4 plus 9; 7 plus 7; 8 plus 8. Important combinations not practiced by Set A but practiced by Set B are 5 plus 9; 6 plus 8. Both sets fail to practice 3 plus 9; 7 plus 9; 8 plus 9; and 9 plus 9.

Conclusions

If drill means anything in excess of mere quantity of work upon a mental function in general, it means that the drill should be so constructed that the constituent elements of the function receive a due amount of practice. To construct drill which observes the principle stated above may fairly be judged to "do something about" the psychology of learning relative to the law of exercise.

Two sets of drill material may contain the same amount of practice and look the same on paper and still provide the pupil with genuinely different kinds of experience in the function which they both purport to exercise.

Analyzing two sets of drill in multiplication, we find that they are equivalent in total amount of practice provided, but that one set has no sophisticated psychological theory supporting it while the other has. For example: Set A prints digits with no reason for the frequencies; Set B prints digits giving preference to the larger digits.

Set A gives over exercise to certain multiplication combinations, gives no practice at all to 30 combinations, and gives but 21 percent of its practice to the presumably harder combinations; Set B spreads its practice over the total function, misses no combination, and gives 46 percent of its practice to the harder combinations.

Set A fumbles on its practice in "carrying." By overweighting its absence of carrying or carrying of one, it helps the child to view carrying as a matter of "carry one" or "do not carry at all." Zero or one is carried about twice to every carrying of another digit once. On the other hand, Set B does not favor the carrying of any one digit in particular. For every carrying of zero or one once, it carries some other digit twice.

Set A provides addition in carrying which involves stepping up from one decile to another 13 times; Set B provides addition in carrying which involves stepping up from one decile to another 34 times. Mathematically, addition is addition, and stepping up is irrelevant. Psychologically, addition within the same decile is not the same thing as addition involving stepping up.

Sets A and B are practically equivalent in the spread of addition drill necessitated in combining the partial products.

In constructing drill material careful analysis of the function to be exercised together with faithful observance of the laws of learning should bring increase in the pupils' skill in that function, for in these ways pupils will be provided with a more fruitful experience with the function.

SYLLABICATION AS A FACTOR IN LEARNING TO SPELL

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Few problems of method have persisted longer than the question of syllabication in the teaching of spelling. Teachers, supervisors, and publishers of spelling texts have been confronted with it for over a century. Yet it is only recently that scientific methods have been called upon to determine objectively the exact form in which words should be presented in order to assure the greatest efficiency in learning. That there is no agreement among educators regarding this point is indicated by the following data taken from a recent investigation of the problem (3).[1]

An examination was made of 61 spelling texts dating from 1800 to 1917. Among these texts the proportion using syllabication and other methods of division was as follows:

Syllabication only	38.3	percent
Syllabication, Diacritics, Accents	20.0	"
Syllabication and Accents	20.0	"
No Division	21.7	"

By combining the three different forms of syllabication the result is 78.3 percent as against 21.7 percent for no division.

An examination of twelve texts published since 1907 shows the following distribution:

Syllabication only	33.3	percent
Syllabication, Diacritics, Accents	8.3	"
Syllabication and Accents	16.7	"
No Division	41.7	"

The combination of the books having three different forms of syllabication gives 58.3 percent as compared with 41.7 percent for no division of the words. These data show two facts quite clearly: First, the tendency to use diacritical marks and accents is decreasing. Second, there is a strong modern movement in the direction of the presentation of the spelling words in undi-

[1] Numbers refer to bibliography at end of this article.

vided form. A further examination of sixty-seven courses of study by the same investigator leads to the less satisfying conclusion that there is no consensus of opinion among makers of courses of study as to the form in which the words should be presented for effective learning.

Three experimental investigations of the problem of syllabication are available. The earliest study, that by Miss Abbott (1), is limited in its conclusions for at least two reasons: First, too few observers were used. It is unsafe to draw conclusions from experiments involving only two subjects, particularly in the presence of conflicting evidence. Second, the form in which the words were presented for learning was not suited to the purposes of this inquiry. Diacritical marks operating simultaneously with the syllabication make it impossible to decide which was responsible for the difference reported.

The second experimental study is that of Professor J. D. Heilman, of the State Teachers College of Colorado (2). This study reports more comprehensive data. Seventy-three children of grades three, four, five, and seven were taught a list of one hundred words which lent themselves to syllabication. These words were selected from those frequently misspelled by the children. The words were written on flash cards for presentation, once as units and once in divided form. The children of each grade were divided into sections by their teachers. In presenting a given word, the experimenter pronounced it twice, once by syllables and again as a unit for the section studying the syllabicated form and twice as a unit for the group studying the unit form. The length of time for study on the words was arbitrarily limited, the time varying according to the grade. The results of this experiment show that "in general, the syllabized form of the word promotes the learning process in spelling."

In spite of the more careful technique of this experiment, there are two limitations upon the conclusions which may be drawn from it. In the first place, there was no attempt to cross-check the two learning-groups as to their relative equality. It seems within the limits of possibility that the differences inter-

preted as due to different forms of the words may have been due to the inequality of the two groups of children. It is doubtful whether the teacher's judgment is a reliable basis for selecting pupils as to their ability to learn to spell a specific list of words. In fact, recent studies on the reliability of measures convince one that any single test is entirely insufficient for such a determination. In the second place, there is the factor of variation in the method of pronouncing the words for the two sections. In general, it seems fair to conclude that the differences which appear in this experiment are due partly to variation in pronunciation, and partly to the inequality of the two groups of children. These influences may have operated in either a positive or negative direction to increase or decrease the real differences.

The most recent investigation of the effect of syllabication in spelling is that of Miss Hattie Wolfe (3). The following general method of procedure was used in her experiment:

1. A suitable list of drill words was selected.
2. A preliminary test on the drill list was given, and on the basis of these results two groups of pupils were selected, comparable in number, sex, and spelling ability.
3. These drill lists were taught to the selected classes under normal conditions, keeping the factors constant with the exception of the form of presentation. In the one class the words were presented for learning in syllabified form; in the other class, in undivided form.
4. A final test of the same words was given under conditions as similar to the preliminary test as possible. The methods were compared in terms of the relative improvement of the two sections.
5. A retention test on the same words was given to determine the efficiency of the two methods as measured by delayed recall.

The general results of the experiment indicate a slight superiority for syllabication. This superiority was less pronounced with the older than with the younger pupils. With the younger pupils the difference in favor of syllabication was 1.7 percent; with the older pupils it was 0.2 percent. Syllabication also appears to insure greater permanency than the undivided form. This superiority was also less marked with the older than with the younger pupils. It is doubtful if a statistical determina-

tion of the significance of the differences upon which these conclusions are based would reveal them to be great enough to afford an answer to the problem. In this experiment as in the former one, the author fails to cross-check the two groups under comparison as to their relative equality.

The feeling that the available evidence on this question was limited by the presence of too many variables prompted the writer to undertake an experiment in which as many as possible of these variables would be under control. The experiment itself involved too few cases to be used as a basis for any but tentative conclusions. It is felt, however, that the method may be sufficiently significant to warrant its presentation.

The purpose was to attempt to determine the real merit of the visual presentation of the syllabicated form of the spelling word as it operates in actual classroom learning. The experiment was planned to eliminate in every way factors operating to create differences from which conflicting or unwarranted conclusions might be drawn. The two methods of presentation are compared as to the way they operate on the *same* children when learning words of equal spelling difficulty. The spelling words are used as the basis for comparison rather than two groups of children because it is much easier to approach equality in the selection of two word lists than it is to do so in the case of two groups of children. Other factors, such as diacritical markings and pronunciation do not enter, for no markings were used, and the pronunciation was the same for both methods of presentation.

The experiment was conducted in grades IV, V, and VI of the University Elementary School by the teachers in charge, under the direction of the writer. These grades were using a plan of individual instruction in spelling in which each child worked only on the words he missed in a preliminary test on the words assigned. The experiment was therefore adjusted to this classroom procedure; and the data reported show the extent to which the two methods of presenting spelling words for learning operated in individual instruction.

The words chosen were somewhat difficult for the grades in

which they were used, so that in the beginning each child made a rather large number of errors. Difficult words were used purposely in an attempt to magnify the differences between the two methods. The fourth-grade list was selected from words which were spelled with an accuracy of from 30 to 32 percent by 200 fourth-grade children of Iowa.[2] The words selected for the fifth and sixth grades had been spelled correctly by less than 30 percent of Iowa school children of the grades for which the words were selected. Fifty words were selected for use in each grade.

Below is given a random sampling of ten words for each grade:

Fourth grade	*Fifth grade*	*Sixth grade*
suggested	athletics	definite
disgusted	continued	exhibition
credited	acquainted	ingredients
remedy	solicit	financial
positive	orchestra	convenience
adverbial	accommodate	unnecessary
believing	assessment	fundamental
calendar	essential	candidacy
geography	individual	politician
ninety	familiar	pneumonia

By a preliminary test these fifty-word lists for each grade were divided into two lists further evaluated for equality in terms of the number of misspellings per word. That is, words missed by a similar percent of the pupils were paired and placed in alternative lists for a given grade. In this manner two very carefully balanced lists of twenty-five words each were secured. These two lists for each grade were known as lists A and B. Each list was then prepared in syllabified and in unit form, the unit form being known as A–U or B–U, the divided form being known as A–S, or B–S. This made it possible to identify each list definitely in the instructions and in actual practice. Mimeo-

[2] From data gathered for the Ashbaugh-Iowa Spelling Scale. The words on which this scale is based are the most frequently used 3,000 words from Andersen, W. N.: "The Determination of a Spelling Vocabulary based upon *Written Correspondence*. Dissertation, University of Iowa, 1917.

graphed sheets of each twenty-five word list were prepared and used as record sheets and study lists for the pupils.

The actual administration of the experiment called for a division of each grade into two roughly equal groups. It was not necessary that great care be taken to secure two sections of exactly equal spelling ability since a "cross-checking" procedure was to be followed in order to obviate this very difficulty. The directions outlining the actual procedure for each day of the experiment including the details of the administration of the plan of cross-checking are given in the following copy of the instruction sheet followed by the teachers throughout the experiment.

General instructions—In general use the method of study set forth in the *Eighteenth Year Book of the National Society for the Study of Education*, Part II, page 72.

Use exactly 15 minutes, no more, no less, *except* on the days when tests are given. On these days allow six (6) minutes daily for study purposes in addition to the time required for the testing. Note the further exception to this on the sixth and twelfth days.

First day—Test by dictation the fifty words assigned to be taught in your grade. Correct the papers indicating each word missed by marking it with a cross (X) in the first blank column of the pupil's individual record sheet. Every child will write the test each day, even if he reaches a perfect score in the first trial.

Second day—Hand to each pupil the blank on which his errors have been marked, first having divided the class at random into two sections I and II. Give Section I spelling list A–U, and Section II spelling list A–S. Have each pupil learn the words marked on his record sheet, using the method referred to above. No test is to be given today. Pupils work independently, and only on those words missed in the preliminary test. Distribute the fifteen minutes so as to cover as nearly as possible the complete list of words missed.

Third day—Test on the twenty-five words, having the pupils record on their blanks the words missed. After the testing and recording allow six (6) minutes for study on the words marked as missed.

Fourth day—Same as third day.

Fifth day—Same as third day.

Sixth day—Test on the twenty-five words. Have pupils correct papers and record errors. Allow seven (7) minutes for study on the words missed in the test. (Seven minutes are allowed for the purpose of bringing the total time up to 40 minutes for the five days.)

Seventh day—Test on the twenty-five words. The teacher should mark these papers recording the errors on the pupil's record sheet. The records should then be turned in at the office.

Eighth day—Give to each pupil one of the spelling lists marked B–U or B–S, on which has been checked the errors made by him in the preliminary test given the first day. Pupils who in the preceding week studied list A–U (the un-syllabified form) are to be given list B–S (the syllabified form of the second word list), and those who studied list A–S are to study from list B–U. For the remainder proceed as on first day.

Ninth day—Test on the twenty-five words, having the pupils record on their blanks the words missed in the test. Allow six (6) minutes for additional study on the words marked as missed in the test.

Tenth day—Same procedure as outlined for ninth day.

Eleventh day—Same procedure as outlined for ninth day.

Twelfth day—Test on the twenty-five words, having the pupils record their misspelled words as before. Allow seven (7) minutes for additional study.

Thirteenth day—Test on the twenty-five words—the final test. The teacher should mark these papers recording the errors on the pupil's record blank.

Delayed recall—Exactly two weeks following the seventh day of this experiment dictate the twenty-five words comprising list A for the purpose of measuring deferred memory of the words. Record these misspelled words on the pupil's record sheet. Exactly two weeks following the thirteenth day of the experiment dictate the twenty-five words comprising list B for the purpose of measuring deferred memory of the words. Record the words missed on the pupil's record sheet.

In this investigation the efficiency of the learning methods is compared in four general ways: (1) In terms of the individual pupil's daily test records; (2) in terms of the individual pupil's growth over the preliminary test records; (3) in terms of delayed recall; (4) in terms of the number and percent of pupils reaching perfect scores in the daily tests and delayed reviews.

The average percents of accuracy in the daily tests and in the two weeks delayed recall are summarized in Table I. The table is read as follows: Pupils of grade IV made an average preliminary score of 33.5 percent on the words studied in syllabicated form, and 34.7 percent on the words studied in unit form. After one period of study the percent was raised to 65.2 percent on

TABLE I. AVERAGE PERCENTS OF ACCURACY IN DAILY TESTS AND IN TWO WEEKS DELAYED RECALL

Grade	Method	Preliminary	Day: 1	2	3	4	5	Recall
IV	S.	33.5	65.2	80.9	86.1	88.0	90.7	79.1
	U.	34.7	70.0	72.6	87.4	88.9	92.3	78.8
V	S.	20.3	56.8	76.3	82.7	84.8	84.8	72.4
	U.	20.0	50.3	72.3	81.0	85.5	78.7	70.6
VI	S.	18.3	49.0	64.3	77.5	84.0	89.0	86.7
	U.	18.7	51.3	71.3	85.7	90.2	91.7	87.0
Averages	S.	24.0	57.0	73.8	82.1	85.6	88.2	79.4
	U.	24.7	57.2	72.1	84.7	88.2	87.6	78.8

the words in syllabified form as against 70.0 percent for the words in unit form, etc. The averages for the preliminary test for the grades indicate a very close equality between the two lists of words studied, one in syllabified form, the other in unit form.

It is quite evident that while the averages of both the syllabicated and un-syllabicated methods are reported under the same day in this table, these are not the results of the same day's teaching. The reversal of the methods with the sections of the class at the end of the first half of the experiment makes it impossible for this to be so. The record of 65.2 percent for the syllabicated group of grade IV means a combination of results in which section B worked on a syllabified list during the first half of the experiment, and section A worked on a syllabicated list during the second half of the experiment. Thus, under *Day 1* are shown the combined data for the first day of both parts of the experiment.

The data showing comparison of the two methods in terms of the percent of improvement over the preliminary records are summarized in Table II which shows the average daily gain over the preliminary scores for each method of learning. Table II is read thus: As a result of the first day's study the pupils of grade IV gained an average of 31.7 percent on words studied in the syllabified form and 27.4 percent on words studied in unit

TABLE II. AVERAGE DAILY GAIN IN PERCENTS OVER THE RESULTS IN PRELIMINARY TEST FOR EACH METHOD BY GRADES

Grade	First Day		Second Day		Third Day		Fourth Day		Fifth Day	
	S.	U.	S.	U.	S.	U.	S.	U.	S.	U.
IV	31.7	27.4	47.5	37.8	52.6	52.6	54.5	54.1	57.2	57.5
V	36.3	32.5	55.7	54.5	62.2	63.0	64.5	67.7	60.7	59.8
VI	29.0	31.5	51.6	51.0	63.1	67.0	65.6	72.3	70.6	74.0
All	32.3	30.5	51.6	47.7	59.3	60.8	61.5	63.7	62.8	63.8

TABLE III. AVERAGE GAIN OF SCORES IN THE TWO WEEKS DELAYED RECALL OVER PRELIMINARY SCORES

Grades	Syllabified	Unit
IV	45.5	43.7
V	52.4	50.9
VI	69.0	68.3
All	55.6	54.3

These gains were calculated from the original preliminary and daily test scores for each child and were then averaged. On this account they will not necessarily check with gains computed by substracting the average preliminary score from the average score for any given day as given in Table I. This method was followed because of irregularity of attendance and also because of the fact that negative gains were frequently made by individual cases.

form. On the second day these scores were raised to 47.5 percent and 37.8 percent respectively above the preliminary scores; etc.

Table III summarizes the data on delayed recall in terms of the average gain over the preliminary test. The table is read as follows: Grade IV gained an average of 45.5 percent on those words studied in syllabified form and 43.5 percent on those words studied in unit form. A further study of Table III in combination with data from Table II shows how the two methods operated to effect retention. Data on this point appear in Table IV.

The data of Table IV show that on those words studied in syllabified form the fourth grade retained 79.6 percent of their

TABLE IV. PERCENT OF EFFICIENCY RETAINED

Grade	Syllabified	Unit
IV	79.6	76.0
V	86.5	85.0
VI	97.7	92.3
All	88.7	85.0

efficiency in the last test in deferred recall as against 76.0 percent for those words studied in unit form.

Table V shows further data on the delayed recall test in terms of average loss per pupil in this test from the test on the last day of study. The average of the three grades shows a slight margin in favor of syllabication.

TABLE V. THE TWO METHODS OF LEARNING COMPARED IN TERMS OF AVERAGE LOSS IN DELAYED RECALL FROM RECORDS ON THE LAST DAY

Grades	Syllabified	Unit
IV	10.0	13.0
V	11.6	8.9
VI	1.7	6.3
All	7.76	9.4

In general, experimental data are compared in terms of class averages. It seems, however, that in an experimental problem attempting to evaluate a teaching method one of the most important measures of the method is the number of individual pupils who are effected by it. Table VI shows a comparison of the two methods in terms of the number and percent of pupils who reached perfect scores in the daily tests. The table is read as follows: Of the 13 cases in grade IV, 3 or 23.1 percent made perfect scores as a result of the first day's study of the words in syllabified form; while 1, or 7.7 percent of those studying the words in unit form reached a perfect score on the first day; etc.

In attempting to summarize the evidence on this question as shown by this investigation it should be remembered that there are certain limiting factors to be considered. In the first place, the experiment is limited to too few grades and cases. Data from grade III would offer us a better basis for measuring the effect of the factor as it operates in the case of the younger pupils. The number of pupils used in this study is probably too small to afford a basis for definite conclusions. (See Table VI). A second factor serving to complicate the treatment of the results is that of irregular attendance in certain grades. In figuring the

averages an absence on the part of any child was considered as of the same importance as that of any other child, except where attention is called to the point in the tables.

TABLE VI. COMPARISON OF METHODS IN TERMS OF THE NUMBER AND PERCENT OF PERFECT SCORES IN DAILY TESTS

	Grade IV (13 pupils)		Grade V (16 pupils)		Grade VI (12 pupils)		All (41 pupils)	
	S.	U.	S.	U.	S.	U.	S.	U.
First day								
Number	3	1	1	2	1	0	5	3
Percent	23.1	7.7	6.3	12.5	8.3	0.0	12.2	7.3
Second day								
Number	4	3	3	3	3	3	10	9
Percent	30.8	23.1	18.9	18.9	25.0	25.0	24.4	21.9
Third day								
Number	7	6	6	4	2	4	15	14
Percent	53.8	46.2	37.5	25.0	16.7	33.4	36.6	32.2
Fourth day								
Number	8	8	7	5	6	3	21	16
Percent	61.5	61.5	43.8	31.3	50.0	25.0	52.1	39.0
Fifth day								
Number	10	8	4	2	2	5	16	15
Percent	77.0	61.6	25.0	12.5	16.7	41.7	39.0	36.6
Totals								
Number	32	26	21	16	14	15	67	57
Average	6.4	5.2	4.2	3.2	2.8	3.0	13.4	11.4
Percent	49.2	40.0	26.3	20.0	23.3	25.0	32.7	27.8

Conclusions

1. The evidence as shown in terms of the daily test scores points to the very slight superiority of the syllabified form of the word. However, the calculation of the statistical significance of these differences shows that in the cases of the largest differences between the methods the probable error of the difference is equal to more than half the difference. This means that the results of this experiment are not sufficient to warrant a positive statement in favor of one method or the other since it is possible that the apparent difference is due to chance alone.

2. In terms of the growth from the preliminary to the final test the syllabicated form of the word is 2.6 percent more efficient than the unit form. This difference is less than the probable error of the difference between the two methods and is thus of doubtful significance.

3. On the surface it appears that there is a certain superiority in favor of the syllabicated form of the word for earlier presentations, for the lower grades, and also in the case of delayed recall. It seems likely, however, that a careful statistical refinement would prove this apparent difference in efficiency of method to be due to other factors than the methods themselves in spite of the carefully controlled and cross-checked experiment.

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IMPROVEMENT IN RATING THE INTELLIGENCE OF PUPILS

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Ratings of traits of character and temperament will be the most important means of gaining information about people for some time to come. While intelligence can now be measured with relative accuracy, measurements of other important traits which make for success in life are not obtainable by objective tests. Until such tests are constructed, ratings will have to be used. This is especially true in school work where teachers are continually being called upon to make estimates of the traits of their pupils. Since ratings play such a large part in the work of teachers, it is important that the factors affecting their reliability be determined. We need more definite knowledge as to the correct methods to be used in increasing the reliability of ratings.

At present there is much interest in the formulation of tests which attempt to measure non-intellectual traits. The best check of the validity of such tests is ratings carefully made. With the advent of intelligence tests it became possible to study ratings made of intelligence as compared with objective measurements of that trait. Such a comparison will give us many facts of value concerning the methods to use in the rating of traits for which we have no objective tests.

This paper is based upon studies of the ability of teachers to estimate the intelligence of their pupils. The studies were made in an attempt to locate the factors which tend to make ratings unreliable and to discover whether the effect of these factors might be reduced. From the results shown here, it will be possible to draw inferences as to the proper methods to be used in obtaining ratings of other traits besides intelligence—traits which are not now measurable by objective tests. Five factors which have an influence in making teachers' ratings of intelligence less reliable have been recognized.

I. Traits Other Than Intelligence

This factor needs very little discussion since it is well known to all who have attempted to rate mental traits that other traits than the one under consideration have their effect. A pupil's industry, personality, and appearance influence the teacher when she attempts to rate for intelligence. An extreme case of this was found by the writer when he asked three teachers to rank a class of twenty-three pupils according to their intelligence quotients. All the teachers were familiar with the pupils. One girl who ranked fourth by intelligence quotients, was ranked second, seventh, and twenty-third by the three teachers. The teacher who had misjudged her so badly when asked her reason stated that in her class the girl had shown an attitude of indifference. The teacher had mistaken this attitude for stupidity; and consequently, although the girl in question had an I.Q. of 119, the teacher had ranked her below a pupil with an I.Q. of 76.

This is one factor which will probably always operate to make ratings of intelligence or of other traits less reliable than the results of objective tests. About the only thing that can be done to lessen its influence is to include in the instructions to teachers a direction to try to eliminate from their minds the general nature of the pupils and think only of the trait under consideration. In rating for intelligence, it will probably help matters to use the terms brightness and dullness rather than intelligence since teachers use these terms and mean by them about the same things as are meant by intelligence and lack of intelligence. It is also important that a good definition of the trait to be rated be included since such terms as intelligence, industry, etc., do not mean the same things to different people.

II. Failure to Consider the Ages of Pupils

When teachers are instructed to rate for intelligence, some of them consider "brightness," others the present mental maturity. In other words, some rate for intelligence quotients, others for mental ages. This appears when we correlate teachers' ratings with the actual scores made on intelligence

tests (this score representing the mental age score) and with the intelligence quotients found from the same tests.

Such correlations have been found by the writer from the ratings made by twenty-five teachers. In nineteen cases the teachers' ratings correlated higher with the intelligence quotients than with the mental ages. A few of the most extreme cases are shown in Table I.

TABLE I. TEACHERS' RATINGS CORRELATED WITH INTELLIGENCE QUOTIENTS AND MENTAL AGES; FIVE EXTREME CASES

Teacher	Correlation With:	
	I. Q.'s	M. A.'s
1	.56	.16
2	.24	.41
3	.30	−.16
4	.51	.16
5	.58	.23

It can be seen from Table I that different standards must have been used by these teachers. The fact that they were no doubt unconscious of standards does not alter this fact. Some of the teachers were evidently thinking of something analogous to mental ages and others were thinking of something more nearly like intelligence quotients. The difference in the two standards can be demonstrated if we take a hypothetical case. Suppose we have five pupils all of whom have mental ages of ten years. Let us further suppose that they have intelligence quotients of 80, 90, 100, 110, and 120. Now, if a teacher were asked to rate these pupils for intelligence, she might consider either their mental maturity or how bright they were for their ages. In the latter case her ranks would resemble the one-to-five ranking according to the intelligence quotients; while in the former case she would tend to rank them all the same. When teachers do not take into consideration the ages of the pupils whom they are rating, the situation just described occurs. For example, a fifth-grade teacher rated the following three pupils as average:

Pupil	Chronological Age	Intelligence Quotient	Mental Age
1	9–8	157	14–4
2	12–1	108	13–0
3	13–2	101	13–4

Evidently these three pupils were doing average school work and the teacher judged them to be equal in ability for that reason. Had the teacher considered their chronological ages, she would have known that the pupil with the chronological age of 9-8 was superior in intelligence or he would not have been in the fifth grade and that the pupil with the chronological age of 13-2 was probably of inferior intelligence or he would not have been retarded.

The effect of this factor should be practically eliminated by instructing the teachers to consider the ages of the pupils to be rated and by stating in the directions that over-age pupils are apt to be dull unless they have some other reason for being retarded and that under-age pupils are apt to be bright. By having the rating done on prepared blanks upon which the teacher first places the ages of the pupils before she begins to rate, there should be little danger that the teacher will overlook this point.

III. The Ages at Which Pupils Are Rated

Younger children are more difficult to rate than older children. The median of seven correlations found by the writer between teachers' ratings and intelligence quotients for third grades was 0.43; the median of ten correlations for fifth grades was 0.47; and the median of nine correlations for seventh grades was 0.59. In a study made by the writer and reported in an earlier issue of this periodical on the selection of bright and dull pupils by their teachers, it was found that, in the eighth grade, teachers selected correctly 42 percent of the bright and 63 percent of the dull pupils, while in the second grade the teachers selected only 22 percent of the bright and 53 percent of the dull.[1]

[1] Varner, G. F. "Can teachers select bright and dull pupils?" *Journal of Educational Research*, 6:126-32, September, 1922.

The effect of this factor on teachers' ratings cannot be diminished. It is useful, however, to know that ratings made of pupils in the lower grades will not be as reliable as ratings made on these same pupils when they reach a higher grade.

IV. Inability of Teachers to Compare Their Pupils with Pupils in General of Corresponding Grades

The effect of this factor is to diminish the value of teachers' ratings when they are compared to each other. A teacher may be a good judge of the rank of her pupils but she may not be able to say whether her good pupils are among the upper ten percent of all pupils of their grade or whether they are just average. Just how a teacher misjudges the caliber of her class can be seen when we take definite cases. Several eighth-grade teachers were asked to rate their pupils for intelligence. The pupils were then classified into five ability groups, first on the basis of the teachers' ratings and then on the basis of the intelligence quotients. The results for two of the teachers are shown in Table II.

TABLE II. COMPARISON OF TWO TEACHERS' INTELLIGENCE CLASSIFICATIONS OF PUPILS WITH STANDARD I.Q. CLASSIFICATIONS

Ability Group	Grade I		Grade II	
	Standard I. Q. Classification	Teacher's Classification	Standard I. Q. Classification	Teacher's Classification
A	5	6	5	0
B	6	10	5	7
C	5	6	8	15
D	3	6	3	2
E	9	0	4	1

Four of the six pupils whom the teacher of grade I assigned to group D were the poorest in her grade. She was able to distinguish that these pupils were her poorest pupils in intelligence but where she erred was in deciding at what level of intelligence they were. She judged that they were of D grade while in reality they were of low E grade. In grade II the teacher erred in

judging that she had no pupils above B when in reality she had five A's. The lowest intelligence quotient represented among the seven pupils whom she selected as being in the B group was 108. This showed that she was able to select her bright pupils fairly well but that she was not able to decide whether they were of A or B intelligence when compared with pupils in general.

The effect of this factor may be at least slightly diminished by including in the instructions a direction telling the teachers to think of pupils in general and not to let their standards be set by their particular grade, which may be above or below the average grade.

V. Influence of the Tendency to Rate too High

Teachers hesitate to believe that they have many really dull pupils, but they are willing to credit a large number of pupils with superior intelligence. One group of twenty teachers who were instructed to rate their pupils and to put about 5 percent in classes A and E and about 20 percent in classes B and D made the following classification: class A, 62; class B, 93; class C, 188; class D, 61; and class E, 6.

These teachers put more than ten times as many of their pupils in class A as they did in class E. They also put 50 percent more in class B than in class D.

Another group of four teachers were instructed to rate their pupils but were not told how many to put into each class. The result of their classification was as follows: class A, 28; class B, 56; class C, 36; class D, 12; and class E, 1.

The tendency to rate too high is clearly shown here where 84 pupils were judged better than average and only 13 were judged below average.

Three departmental teachers made a pooled judgment of the intelligence of their pupils with the following classification resulting: class A, 5; class B, 7; class C, 14; class D, 1; class E, 2. Here four times as many pupils were rated above average as were rated below average.

Thus, the same tendency appears in each of these three attempted classifications, although they were collected under dissimilar circumstances—namely, the tendency to rate too high. This fact must be taken into consideration in any scheme for obtaining ratings.

The effect of this factor may be greatly diminished by instructing each teacher to total the number of pupils whom she has rated above and below average. The number above average should correspond to the number below average unless the teacher feels sure that her class is better or poorer in intelligence than the average class of her grade.

Keeping in mind the disturbing influences which have been described, the writer has made a set of directions for the use of teachers in rating pupils according to intelligence. In determining the number of steps to have in a scale, it must be borne in mind that the ratings will only be rough measures and that a large number of steps will be useless. It was decided that five steps in the scale would meet the requirements. It was also decided that the frequencies of the ratings at each step should conform to the normal curve of distribution, since intelligence is known to distribute itself in that manner.

In selecting a definition of intelligence, a large number were considered many of which, it was decided, were too technical to be included in a set of directions to be used by teachers. The definition selected for use closely corresponds to the definition used by the Virginia Education Commission which is an excellent definition put in terms that should be understood by any teacher.

Since good results were claimed for the Army rating scale which uses a man-to-man comparison, it was decided to use the same method as a child-to-child comparison. There is some question as to whether this kind of a comparison is the best possible method of obtaining ratings, and experimental work may show that some form of graphic method is capable of obtaining more reliable ratings. The main purpose of this paper, however, is to determine whether it is possible to improve ratings;

and, if it is found that the child-to-child comparison helps to improve ratings, then we can expect that a better scheme will bring further improvement.

The rating scale in its final form contains the instructions which are here reproduced:

DIRECTIONS TO TEACHERS

The rating will be done on a five-point basis as follows:

A means *superior*, the rating given to the brightest five percent of school children.

B means *high average*, above the average but not so high as A. About 20 percent of all children would normally receive this rating.

C means *average*, the rating of the middle 50 percent of children.

D means *low average*, below the middle 50 percent but not so dull as the lowest five percent. About 20 percent of all children would normally receive this rating.

E means *inferior*, the rating of the dullest five percent in school.

By intelligence is meant the degree of brightness of a child. It is not the same as scholarship. Think rather of the skill with which a child is able to meet new situations, both in school and out. The most intelligent child does not always make the highest marks in school. An intelligent child may earn high school marks if he is industrious, if he is physically well, if he is regular in attendance, and if other school conditions are favorable. If these conditions are not favorable, he may still be very bright and not earn high marks.

Eliminate from consideration all other traits of the pupils whom you are rating except the trait of intelligence. Do not let the general value or the personality of the pupils influence your rating of this specific trait.

A rating scale or measuring stick must be made before you begin to rate your pupils. Each teacher must make her own scale. A scale is made by selecting one or more children for each of the five ratings of intelligence. These children who will constitute your scale may be members of the class you now have or of classes you have taught before. For the step on the scale corresponding to superior intelligence, select one or two of the brighest children you have ever known. For the step corresponding to inferior, select one or two of the dullest children you have ever met in school. Fill in the average with the name of an average child and then proceed to fill in the steps between the average and the two extremes.

A sample scale might look like this:

Superior	rated	A.	Mary J.
High Average	"	B.	John S., William B.
Average	"	C.	Roy C., Grace B.
Low Average	"	D.	Robert S.
Inferior	"	E.	Ruth B., Arthur A.

After you have completed your scale, compare each pupil to be rated with the pupils whose names are on the scale and rate him accordingly.

Take into consideration the age of the pupil to be rated. Before you begin to rate, have the age of each of your pupils before you. To do this fill in the first column of the rating sheet the first thing you do. A child who is over-age for his grade is apt to have low intelligence unless his retardation is due to non-attendance or sickness, and a child who is under-age is apt to have high intelligence.

In rating try to think of children in general of your grade. You may not have any bright children compared with children in general of your grade or you may have more than the average number of bright children. This depends a great deal upon the community from which your pupils come.

After you have finished rating, note the number of pupils you have rated above and below average. If your grade is a normal one, these totals should each include about 25 percent of your pupils. Do not have more than 25 percent above or below average unless you feel sure that your class is better or poorer than the average class corresponding to your grade.

A rating sheet is provided for each teacher. It includes a column for the ages of the pupils in order to make sure that the teachers do not neglect to have the ages of their pupils before them when they rate. The rating sheet is reproduced herewith. The teachers are instructed to put a check in the proper column after each name.

Since in the use of this scale teachers are expected to rate according to the intelligence-quotient idea, the scale was first

RATING SHEET

Name of Pupil	Age	A. Superior	B. High Average	C. Average	D. Low Average	E. Inferior
Smith, James	12-11					

tried out with several teachers to see whether it was helpful to them in considering the intelligence quotient as the standard of intelligence. The scale in approximately its final form was first presented to three teachers of the Lake Wilson School, Minnesota, who were asked to rate their pupils with it. One teacher rated 20 pupils of grades III and IV, another rated 29 pupils of grades V and VI, and the third rated 24 pupils of grades VII and VIII. The Haggerty Intelligence Examination, Delta 2, was given to the pupils, and the scores were translated into intelligence quotients. Each teacher's ratings were then correlated with these intelligence quotients and also with the mental ages. The results were as shown in Table III.

TABLE III. CORRELATION OF TEACHERS' RATINGS (BY SCALE) WITH M.A.'S AND I.Q.'S. LAKE WILSON SCHOOL

Grades	Correlation With:	
	I. Q.'s	M. A.'s
III—IV	.66	.56
V—VI	.81	.80
VII—VIII	.76	.62

In each case the teacher's ratings conformed more closely to the intelligence quotients, although in one case the difference was slight. The results seem to indicate that the scale helps teachers to rate their pupils according to intelligence quotients.

The second attempt to use the scale was to determine whether teachers could do better with the scale than without it. This investigation was in two parts. The first part was made with 29 eighth-grade pupils of the Prescott School, Minneapolis. These pupils had been rated by the combined judgment of three teachers who knew them through contact in departmental teaching. Each of these teachers was asked to rate the pupils again, this time with the scale. A composite score was then obtained by averaging the three ratings. The pupils' mental ages and intelligence quotients as found from the Delta 2 test were correlated

with the ratings of the teacher and the correlations of Table IV were found.

The composite rating of the three teachers improved when the scale was used from 0.85 to 0.90. In obtaining the first composite rating, the teachers were instructed to rate for intelligence with no definition of what that term meant. The results from

TABLE IV. RELATION OF COMPOSITE RATINGS (WITH AND WITHOUT THE SCALE) TO M.A.'S AND I.Q.'S. PRESCOTT SCHOOL

	Correlation With:	
	I. Q.'s	M. A.'s
First composite rating (*without the scale*)	.85	.52
Second composite rating (*with the scale*)	.90	.58
Individual teachers' ratings (*with the scale*)		
Teacher A	.84	.62
Teacher B	.87	.64
Teacher C	.83	.43

this first composite rating show quite clearly that in this case a comparison made between the teachers' ratings and test scores would be much lower than when the intelligence quotients are used for the standard of intelligence. It is an additional item of data to support the conclusion that test scores should first be translated into intelligence quotient scores before teachers' ratings are correlated with mental test results.

The second part of this investigation was made with five teachers of the Simmons School, Minneapolis. These teachers were first asked to rate their pupils for general intelligence and were left to determine for themselves what was meant by the term general intelligence and what method to use in their rating. Within a few days these teachers were given the rating scale and asked to re-rate their pupils. The correlations between these two ratings and the results of the Delta 2 tests are given in Table V.

The numbers in italics show correlations with I.Q.'s resulting from using the scale. All of the teachers, except the teacher of the V-C grade, were able to make considerable improvement with their rating when the scale was used. In the case of the V-C grade both correlations are relatively unreliable because of the small number of pupils.

From all sources mentioned in this paper, eleven correlations were found for individual teachers between the Delta 2 intelligence quotients and the ratings made by the use of the scale. These correlations have already been given, but they are here repeated in the order of their size beginning with the smallest: 0.63; 0.64; 0.64; 0.66; 0.67; 0.70; 0.76; 0.81; 0.83; 0.84; 0.87. The median of these correlation coefficients is 0.70.

TABLE V. CORRELATIONS WITH AND WITHOUT THE SCALE
SIMMONS SCHOOL

Class	Number of Pupils	Correlation With:			
		Intelligence Quotients		Mental Ages	
		1st rating	2nd rating	1st rating	2nd rating
V-C	15	.71	*.70*	.66	.64
V-A	32	.45	*.63*	.40	.39
VII-B	39	.61	*.64*	.52	.58
VII-A[1]	37	.58	*.67*	.23	.71
VII-A[2]	49	.31	*.64*	.42	.81

The writer does not claim that ratings made by the use of this scale will average as high as the correlations given here since these were mostly made by experienced, well qualified teachers in large school systems. Moreover, in all but three cases the rating was a repeated rating and teachers might well be expected to improve a little in their second attempt to rate the same pupils. Neither does the writer claim that the child-to-child comparison used in this study is the best method to use in obtaining ratings.

What the writer does claim is that ratings now considered unreliable can be made fairly reliable by the use of a well constructed rating scale which takes into account the five factors

discussed in this paper. We need not despair of being able to use ratings as a check against objective tests of mental traits. On the contrary we should, by means of experimental study, seek to improve ratings to such a degree that they can be used for such checking purposes.

The improvement of rating scales seems to be the first of the necessary steps to be taken before we can successfully formulate tests of character traits, for it would be useless to construct a test of a character trait unless some fairly well standardized check of its validity is obtainable. Ratings by competent judges appear to the writer to be the only solution.

THE FACT BASIS OF A HISTORY, GEOGRAPHY, AND CIVICS CURRICULUM

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What notable places, persons, and events should be presented to children in the public school curriculum? A scientifically derived answer to this question must precede the making of any satisfactory courses of study in history, geography, and civics, and of really valuable standard tests of information in these school subjects. Probably such an answer can be secured by scrutinizing the usages of intelligent adults. The child should be taught the facts which as a man he will need to know.

Aided during the second year by a subvention from the Commonwealth Fund, a research group of teachers in the Winnetka schools has spent two years in ascertaining what places, persons, and events are most frequently alluded to in nationally read periodicals. Intelligent American adults will certainly have to be able to identify readily such allusions, because a knowledge of them is habitually taken for granted by writers and editors. A quantitative statement of the allusions appearing in such magazines makes a firm foundation for that part of the social-science curriculum which seeks to give children the fact knowledge that they will need.

The Winnetka research group has collected all the allusions to places, persons, groups of persons, events, and dates which occurred in 266 numbers of 18 magazines and newspapers, published during the 18-year period, 1905-1922. The periodicals are the *Atlantic, Bookman, Christian Science Monitor, Cosmopolitan, Century, Literary Digest, Chicago Herald-Examiner, Good Housekeeping, Ladies' Home Journal, American, Nation, Outlook, Saturday Evening Post, Scribners, Chicago Tribune, World's Work, New Republic,* and *New York Times.* The selection was carefully made so as to embrace all classes of readers. Of all these periodicals except the last two, 15 numbers

were read; there were 16 of the *New Republic* and 10 of the *New York Times*. Each publication was sampled at regular intervals throughout a considerable range of years, so that the inquiry as a whole draws material from nearly every month of the period from 1905 to April, 1922, and from no one month in disproportionate degree.

From all the 266 periodicals read, every allusion of the kind sought was culled, and its date and place of occurrence noted. The group engaged in the inquiry was made up of twelve well-read teachers. Allusions which none of these could recognize were discarded as unimportant for our purpose.

The allusions were first recorded on slips of paper. These were then sorted alphabetically. From them each topic was next entered on a single sheet, so ruled as to incorporate a complete record, arranged by periodicals and by dates of occurrence. These sheets were arranged first in alphabetical order, and for convenience a catalogue of them was made. They were then distributed according to the frequencies of occurrence of their several topics, as explained later in this report.

During the early part of their reading, the research group sought to lighten their labors by observing an axiomatic exemption list, composed of items of such indubiable importance and certainty of frequent occurrence that the effort of recording them might be saved. This list comprised the principal countries of the world, the American states, the most notable mountains and bodies of water, several cities, a few events, and a few persons and groups of persons. Illustrative of these classes are England, Pennsylvania, Andes, Lake Superior, the Nile, Boston, the Civil War, Napoleon, and Congress. There were 182 items in all thus exempted from collection.

After 201 magazines had been read, the group decided, however, to disregard this exemption list and collect all allusions found during the remaining reading. This procedure served as a check on the validity of the list. In general, the exemptions were found to be the items actually occurring most frequently. Yet a few striking exceptions appeared, illustrating the insecur-

ity of *a priori* judgments of this sort. Six topics, indeed, included in the list, were found not to occur even a single time in the 65 periodicals read without exemptions. These were the Appalachian Mountains, Mt. Blanc, the Church of England (as such), the Great Lakes (as such), the Antarctic Ocean, and Lake Huron.

In tabulating the allusions according to frequency of occurrence, we thought it best to extend by computation the frequencies of items on the original exemption list, so that they might appear in approximate order in the final catalogue. The calculations effecting this were very carefully made, as described herein in a later paragraph.

A statement of the gross totals regarding allusions found illustrates the magnitude of our work. In the 266 periodicals read, we noted and recorded 75,839 occurrences of allusions. Ultimately to avoid an almost interminable catalogue, we did not list topics appearing in fewer than six "periodical years." This term is explained below. Of items alluded to at least this many times, we recorded 56,021 occurrences. By computation extending the frequencies of original exemptions, we brought this figure up to 92,121. This, then, is the total number of allusions—observed and estimated—which we have catalogued. They are distributed among 1,423 topics, each of which we found alluded to in at least six "periodical years."

Several standards for determining the relative importance of topics are undoubtedly available. The seminar group, after long discussion, concluded that the most significant factor is the number of *periodical years* in which any topic appears—occurrence in one periodical in any one calendar year being the unit. For example, if Foch is mentioned in one periodical, in just one calendar year, he scores one periodical year no matter how many allusions there are to him in that periodical. If in any one year two periodicals refer to him, he scores two periodical years, and so on. This standard requires that every allusion which is to be adjudged very important must appear in many periodicals and many calendar years. Items confined to a few years or to a

few magazines are subordinated, although they may occur numerously within this limited range. Spread among periodicals is assumed, in this sort of ranking, to be exactly as important as spread among years of publication.

The standard second in significance, to be applied only when items are tied for place in the first ranking, was considered to be the *range,* or length of time, within the 18 years scanned, during which a topic continues to be alluded to. It is determined by counting the years included between the earliest and latest allusions noted.

The standard third in importance was judged to be the *number of articles* in which allusions to an item appeared.

The standard fourth in weight was deemed to be the *number of allusions* occurring. This would, perhaps, seem at first to be the most significant factor. Close study of our records, however, often shows two or three heavily loaded articles supplying the bulk of the allusions to certain topics—a factor which clearly reduces the value of a simple numerical count of occurrences.

Concluding this report is a partial catalogue of the topics found to be alluded to, arranged in the order of their importance. On this list the topics originally on our exemption list, whose position is therefore determined not altogether by actual count but partly by computation, are starred. The procedure by which these topics were placed was as follows: Regarding each of the four standards, herein just described, the records of a random one hundred topics which were *not* on the exemption list were examined. These had been kept in a way which separated the allusions found in the first 201 periodicals read from those in the final 65. Averaging together the occurrences of these 100 topics in the total 266 readings and comparing these figures with the averages of the occurrences in the last 65 readings, we were able to compute *index* figures expressing the general relationship of the first group to the second group of periodicals regarding the frequencies of the allusions they contained.

It was found that, for the average of 100 topics, the periodical years of readings from the 65 magazines needed to

	Periodical years	Spread	Number of articles	Number of allusions
*America (meaning U. S.)	103	18	1211	5903
*England	103	18	1155	3315
*France	100	18	1390	3848
*New York (city)	100	18	911	2386
*China	98	18	353	75
*London	95	18	629	1303
*Germany	92	18	674	3015
*Boston	92	18	297	564
*New York (state)	86	18	594	1090
*Paris	86	18	516	1494
*Italy	86	18	428	1140
*Japan	86	18	267	902
*Great Britain	83	18	400	1539
*Europe	81	18	837	1995
*United States	81	18	659	1725
*Rome	81	18	202	604
*California	81	18	193	269
*Russia	78	18	362	1730
*Ireland	78	18	288	674
*Spain	78	18	279	649
*Greece	78	18	264	761
*Washington, D. C.	75	18	457	899
*Chicago	75	18	350	618
*Indians (American)	75	18	240	814
*Africa (incl. N. and S. Afr., etc.)	75	18	216	441
*Roosevelt, Theodore	74	18	257	617
*Congress	72	18	255	632
*Scotch, Scotland	72	18	216	337
*Canada	72	18	216	199
*Philadelphia	72	18	213	354
*Lincoln, Abraham	72	18	142	160
Harvard	70	18	137	236
*Switzerland	69	18	124	176
*Atlantic	66	18	172	193
*Holland	66	18	169	460
Wilson, Woodrow	65	18	380	789
*India	63	18	151	255
*Egypt	63	18	130	286
*Hudson river	63	18	124	121
*Jew; Jewish	63	18	109	460
*Australia	63	18	103	174
*New England	63	17	178	247
Taft, Pres.	62	15	170	411
*Poland	61	18	175	281
*Berlin	61	18	133	219
*San Francisco	61	18	121	165
*Washington, George	61	18	109	216
*Civil War	61	16	148	162
*Austria (incl. Austria Hungary)	59	18	193	429
*Maine	59	18	80	86

be multiplied by 2.79 to be made equal to those from 266 magazines, and that similar extensions of the second, third, and fourth standards required multiplication by 1.18, 2.97, and 2.81 respectively. Assuming that the same relationship exists, in general, for the exemption list, we obtained approximate final figures for each of the topics on this list by multiplying by these index figures the frequencies actually observed for them in the last 65 periodicals.

The first 50 topics in the catalogue are here listed, with the figures which determine their rank. The first column gives *periodical years;* 104 periodical years are possible. The second column gives the *spread;* a spread of 18 years is the maximum possible. Third appears the *number of articles* in which allusions appeared, and fourth, the *number of allusions.*

THE EFFECT OF LOCALITY ON LANGUAGE ERRORS

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A number of investigations of the language errors of children have been made in the northern part of the country. None, however, has been published concerning localities farther south than those from which Professor Charters derived his material. In the investigation here reported it has seemed worth while to show the nature of language errors in Louisiana and to compare them with errors prevalent in other sections. Data are also offered on the frequency of such errors in the different grades.

With the cooperation of Mr. John M. Foote of the State Department of Education and the superintendents of seven parishes of Louisiana, a language survey was undertaken. The written work of 4,237 children was collected for one week. Similar data were gathered by Miss Josephine Thomas from the written work of 4,381 children in the New Orleans schools; and permission was given to use her results. We were thus able to utilize returns from 8,618 children, of whom 4,039 were boys and 4,579 were girls. At the same time the oral errors of pupils in six parishes were observed by the teachers for one week and were reported for use in this connection.

For purposes of analysis the written errors were classified into two main groups: (a) form errors—punctuation, capitalization, sentence form—of which 30 different kinds were listed and afterwards condensed to 25; (b) syntactical errors—a convenient term for 21 grammatical mistakes. The distribution of the form errors, both by types and by grades, is given in Table I. The syntactical errors are similarly distributed in Table II. In these tables the entries are in terms of ranks. For example, the reading of Table I indicates that the omission of the period at the end of a sentence is the error of most frequent occurrence in every grade except the eighth where it is second in point of frequency.

TABLE I. FORM ERRORS
(Relative Order of Frequency)

	Grades					
	III	IV	V	VI	VII	VIII
PUNCTUATION AT END OF SENTENCE						
1. No period	1	1	1	1	1	2
2. No question mark	6	12	11	16	18	20
3. Question mark for period	11	19	20	24	24	22
4. Period for question mark	12	13	15	15	13	12
5. Extra period	15	11	14	13	17	21
6. Extra comma	23	23	23	23	23	23
COMMA						
7. Series	17	15	16	12	11	11
8. Address	13	14	12	17	12	14
9. Comma for period	16	17	13	9	8	5
10. Period for comma	21	16	17	18	19	17
11. Comma omitted with loss of clearness	14	8	9	11	14	15
12. Appositive comma omitted	22	22	21	19	16	16
QUOTATION						
13. Quotation marks omitted	5	6	5	7	9	9
14. Wrong quotation	25	21	22	22	22	24
SINGULAR-PLURAL						
15. Singular for plural form	10	9	10	8	10	10
16. Plural for singular form	20	20	19	21	21	18
CAPITALIZATION						
17. No initial capital	2	2	2	2	2	1
18. Proper name	7	7	7	5	7	4
19. Pronoun I	18	24	25	25	25	25
20. Wrong capitalization	4	4	4	4	3	6
POSSESSIVE						
21. Wrong possessive form	9	5	6	6	6	7
a. No apostrophe and *s*						
b. Plural for singular possessive and vice versa						
c. No apostrophe						
CLAUSES						
22. *And* clauses	3	3	3	3	4	3
SENTENCES						
23. Incomplete sentence	8	10	8	10	5	8
ABBREVIATION						
24. Incorrect form of abbreviation	24	25	24	20	20	19
HYPHEN						
25. Hyphen omitted	19	20	18	14	15	13

As has already been said, oral errors were also observed for one week in six of the parishes. An attempt was made to classify the returns according to the Cincinnati report of oral errors;[1] but the scheme could not be followed completely since some teachers evidently did not regard certain mispronunciations and wrong verb forms as grammatical errors. With these exceptions, however, the 3,327 oral errors were distributed by types (Table III) according to the Cincinnati report. In Table III there are also shown for each grade the total number of oral errors and the percent which each type of error was of the total number for the grade. Since in some schools the grades were not specified, the errors were grouped together for grades III to VI and for grades VII to XI. It is obviously precarious to draw conclusions from data collected in this way, but it seems that as regards the percents of the different items, the Louisiana errors show great similarity to those of the Cincinnati study. The extremely small number of oral errors in the use of prepositions is probably not due to absence of such misuse on the part of the children. In their written work, as reported in Table II, mistakes of this type were sufficiently prevalent. The fact probably is that such errors are so common that they pass unnoticed. The verb errors seem more common than the Cincinnati percents indicate, especially in impossible tense forms and in the confusion of the perfect participle with the past tense. With these exceptions, however, the different classes of errors are proportionately similar.

Tables I and II show the relative frequency of written errors arranged in ranks from highest to lowest. Tables IV and V give these same results in a condensed form both by ranks and by percents. The data of Tables II and V may be compared with the results found for Northern Illinois by Superintendent O. S. Thompson of Waukegan.[2] This comparison shows that syn-

[1] Sears, Isabel and Diebel, Amelia. "A study of the common mistakes in pupils' oral English." *Elementary School Journal*, 17:44-54, September, 1916.

[2] Charters, W. W. "Minimal essentials in elementary language and grammar," *Sixteenth Yearbook, National Society for the Study of Education*, Part I. Bloomington, Illinois: Public School Publishing Company, 1917, pp. 88, 89.

TABLE II. SYNTACTICAL ERRORS

(Relative Order of Frequency)

	Grades					
	III	IV	V	VI	VII	VIII
Verbs						
1. Verb and subject disagree in number	2	2	2	1	1	1
2. Impossible tense form	3	3	3	3	3	3
3. Past participle for past tense	9	11	8	8	13	11
4. Incorrect mode and sequence	10	9	6	7	6	12
5. Wrong tense—present for past	1	1	1	2	2	2
6. Verb for noun	19	16	18	21	21	19
Pronouns						
7. First personal pronoun standing first in series	20	19	19	20	20	20
8. Pronoun for demonstrative adjective	7	4	11	6	5	7
9. Wrong form of pronoun	18	17	15	14	10	14
10. Object of verb or preposition in nominative case	17	14	17	16	15	17
11. Objective case for subject	21	21	16	17	16	10
12. Predicate nominative in objective case	14	12	9	10	11	9
13. Pronoun and antecedent disagree in number	11	13	14	15	14	18
Negatives						
14. Double negatives	6	6	4	4	8	4
Syntatical redundance						
15. Syntactical redundance *e. g.*, (Henry he, I did it me, I went a fishing)	13	10	12	11	9	5
Prepositions						
16. Wrong preposition	5	8	10	9	7	6
17. Confusion of preposition and conjunction (like *for* as)	15	15	13	12	17	15
Adjectives and adverbs						
18. Confusion of adjective and adverb	16	20	21	18	19	21
19. Misuse of adjectives (much, few, less, and adjectives used as nouns)	8	7	7	13	12	13
20. Wrong comparison	4	5	5	5	4	8
Articles						
21. Wrong article	12	18	20	19	18	16

TABLE III. ORAL ERRORS
(Percent of Total Number in Each Grade)

	Grades							
	III	IV	V	VI	VII	III-VI	VII-XI	Total
Total number of errors	*558*	*530*	*593*	*318*	*205*	*872*	*251*	*3327*
1. Verb and subject disagree in number	11	9	12	9	9	10	8	10
2. Impossible tense form—aint, etc.	22	19	12	5	15	8	10	13
3. Past participle for past tense	3	20	19	16		18	10	14
4. Incorrect use of mode and sequence	16	11	18	22	17	22	22	18
5. Present for past tense	6	3	4	3	3	1		3
All verb errors	4	3	3.5	5	6	3	6	4
	62	*65*	*69*	*60*	*50*	*62*	*56*	*63*
7. First personal pronoun standing first in series	3	2	2	3	3	6	1.5	3
8. Pronoun for demonstra-adjective			4	2	4	2	3	2
9. Wrong form of pronoun	2	1	2.6	1	1.5	1		0.5
10. Object of verb or preposition in nominative case					4		6	0.7
11. Objective case for subject	5	2	3	7		3	7	4
12. Predicate nominative in objective case	1	5			2.5	1		1.5
All pronoun errors	*11*	*10*	*12*	*13*	*15*	*13*	*18*	*13*
13. Confusion of adjective and adverb	1	1	4	3	2	3	4	2.5
14. Misuse of adjectives (much, few, less, and adjectives used as nouns)	3	2	0.7			2	2	1.7
15. Wrong comparison								
All adjective-adverb errors	*4*	*3*	*5*	*3*	*2*	*5*	*6*	*4*
16. Double negatives	14	16	11	20	20	12	11	14
17. Syntactical redundance (Henry he, I did it me, I went a fishing)	8	4		5	11	8	9	6
18. Wrong preposition	1	0.5	1					

tactical redundance and adjective-adverb confusion are relatively more prevalent in the Louisiana schools than in the schools of northern Illinois. However, the comparable items reported from Kansas City, Detroit, Bonham (Texas), and Columbia (Missouri)[3] have the same relative order of frequency for the larger

[3] Charters, *Op. cit.*, Table IX, p. 101.

groups of errors (verbs, pronouns, adjective-adverb, redundancy, prepositions and negatives) as that given in Table IV of this article. The actual percents (if calculated on the basis of comparable items) in Table IX of the Charters report indicate that 55 percent of the errors were verb forms, 19 percent pronoun forms, 12 to 15 percent adjective-adverb confusion, 12 to 10 percent redundancy, 1 percent double negatives, and 1 percent preposition-conjunction. Hence the Louisiana percent of 67 for errors in verb forms is very large, and the other percents are, of course, proportionately reduced. The greatest

TABLE IV. FORM ERRORS

	Grades												Total	
	III		IV		V		VI		VII		VIII			
	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%
Terminal Punctuation	1	39	1	34	1	35	2	35	2	35	2	28	1	34.7
Comma	5	5	4	8	4	8	4	8	3	11	3	13	4	8
Quotation	4	5	5	4	5	6	5	4.7	7	4.6	7	3.5	5	5
Singular-Plural	6	2.5	7	3.4	7	2.5	7	3	8	3	8	3.5	7	3
Capitalization	2	33	2	34	2	33	1	36	1	40	1	40	2	34.5
Possessive	8	2	6	4	6	4	6	4.4	6	5	5	4	6	3.7
And Clauses	3	10	3	9.4	3	9	3	6	4	6	4	5	3	8.6
Incomplete Sentence	7	2.5	8	2.4	8	2.3	8	2	5	5	6	3.5	8	2.7
Contractions	9	1	9	1	9	.5	9	.5	9	.9	9	.3	9	.8

TABLE V. SYNTACTICAL ERRORS

	Grades												Total	
	III		IV		V		VI		VII		VIII			
	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%	Rank	%
Verbs	1	76	1	68	1	66	1	66	1	57	1	58	1	67
Pronouns	3	5	2	10	2	9	2	11	2	16	2	19	2	10
Negatives	7	1.6	7	1	7	1	7	1	7	1.5	7		7	1
Syntactical Redundance	2	6	4	5	4	6	5	5	4	7	5	4	4	6
Prepositions	5	4	5	4	6	5	4	6	5	6	4	5	5	5
Adjectives and Adverbs	4	5	3	7	3	9	3	9	3	9	3	11	3	8
Articles	6	3	6	4	5	5	6	2	6	2.5	6	3	6	4

contribution to this large percent of verb errors is found in the use of present tense forms for the past, especially in grades III, IV, and V. It is worth noting that the percent of this particular error as found in Louisiana corresponds to that of Bonham, Texas, as given in Table IX of the Charters report.

In general, then, the relative order of frequency of syntactical errors is very similar to that which other investigators have found if these are classified into large groups such as verb, pronoun, adjective-adverb confusion, etc. On the other hand, specific errors vary with the locality, even in such restricted districts as a parish or school. Certain kinds of verb errors are more prevalent in one school district than in a neighboring district, or in one parish than in the adjoining parishes. A similar conclusion might be drawn from Charters' Language Tests. The difficulty-frequency obtained in using the verb test in the New Orleans schools was with two or three exceptions the same as the differential values assigned by Charters. But variations in schools in different parts of the city were striking.

An illustration of a common error that varies in frequency with the different localities reported in this survey is that of using a present for a past form of the verb. The papers of some of the parishes and even of schools in the same parish showed very marked differences in the prevalence of this error. On the other hand, among the oral errors reported from these children, the most conspicuous mistake was the use of the past participle for the past tense and vice versa. In fact, this particular blunder was reported as often as all the other misuses of verb forms combined, although it constituted only a very small percent of the written errors. An attempt to account for this discrepancy discloses the fact that two-thirds of the confusion between the present and past tenses occurs in the regular verbs and thus may not be very noticeable to the ear. The misuse of *done, went, seen, took, came, wrote, broke* strikes the ear so aggressively that the error is more likely to be noticed. The fact that children very frequently write "to asked," "did walked," and so on, shows how little they appreciate the distinction in these verb forms.

The form of redundant expressions also varies with the locality. In some districts such forms as the following were common: "He went a fishing," "a horseback riding," "a cow hunting," "a flower picking," "a swimming," "a watching," "a scaring;" "he had a plenty money," "he took a holt." In others these were the more prevalent forms of redundancy: "where at," "where to," "this here," "that there," "neither" and "either" at the end of the sentence. In still other localities redundant expressions such as these were noted most frequently: "I saw it me," "John he did it he."

Prepositions as used in these papers show most varied peculiarities common to limited localities. The prepositions, *to* and *at*, *in*, *on*, *after*, and *for*, are often confused. In some parishes the children "go *at* the store," but they "stay *to* home"; they "go *after* something" and "send *after* me;" they "live *on* 443——— Avenue," they "reach *at* things," tease the boy "*for* his mishap," invite their friends "*at* the house," come "*in* the right time," and read "*on* the newspapers." To "wait *on* me" is often used instead of to "wait *for* me." Prizes are offered "*on* the best garden," things are "different *to* others," cake is made "*with* flour," dresses are "trimmed *in*," and ladies "dressed *with*" fur. They are lonesome "*for*" or "*from*, their chums," "glad *with* their presents," run over "*with* an automobile," and "*without* themselves from fear." *By* is used for all relations of nearness: they "sit *by* each other," or "go *by* each other." The use of *in* for *into* is common everywhere, but in these papers *into* is often used for *in*, as "a deposit into the bank." The omission of the preposition is also peculiar. With words denoting time and place the preposition is omitted more frequently than it is used, as "morning," "afternoon," "December day," (for "in the morning," "in the afternoon," "on a December day.") The preposition is repeatedly omitted with *plenty*: "plenty flowers," "plenty money."

Verb forms are also markedly distinctive of limited districts. One peculiarity, included under the heading *wrong mode and sequence*, is the use of *would* in the narration of past events.

"When they would get tired of riding, they would jump off and would run up the road. They would holler and sing all the way. They would stop near the river and would eat their lunch. If the boys would have guns, they would go hunting," and so on. Evidently the simple past tense is demanded by the narrative. Probably this error is closely related to a peculiar sentence form often heard in our classrooms: "Ten apples from twenty-five would be?" "What topic would include these points?" "What would you call an interesting story?" Such sentences may not be incorrect in form, but they show an evasion of direct, accurate statement that may be an obstacle to clear thinking. Another frequent circumlocution is the repetition of *went* with all forms of activity, as: "They went and lost the way," "They went and ate their lunch," "He went and bought the book." *Went* is also often used in expressions where *began* with the infinitive should be used, as: "They went to playing, cooking, barking," "It went to raining."

Some of the colloquialisms may be of interest for comparison with those of other localities. The letters written by children from some of the schools began in a large number of cases as follows: "Dear Mary, I want to let you know," or "I am writing to let you know," for "I wish to tell you," or "I am writing to tell." These same children also frequently wrote "I ask can he come," "The teacher ask did he know, did I want," "They ask was the man." In such indirect questions the use of *if* and *whether* should be stressed more in the language work.

Another peculiarity typical of some districts is the use of *tell* or *say* for *ask*. "They told for me to go," "She said did I . . . . ," "They said could I come." The use of *make* for a variety of performances is equally marked. "I make my work, my example, my home work, the test, the housework, a good examination." "He will make it kinder." A letter is often written to find out "what you made in your books." This special use of *books* was noted in only two parishes. Such expressions as: "test in our books, passed my books," were frequent. Another school colloquialism, also found only in a limited num-

ber of districts, is "School takes in at 9 and leaves out at 3." In reference to enjoyments, characteristic questions in some papers are: "Did you spend a good time?" "Did you pass a fine time?" "Did they show you a nice time?" All these expressions are interesting from the standpoint of foreign and English idioms.

Two verbs that have acquired a meaning peculiar to this part of the country are *run* and *carry*. The use of run as an active verb, "They ran to run him out," "They ran a Mardi Gras," is not heard elsewhere. To many Americans it seems strange that "boys carry an automobile" or "carry 10 dogs on a hunt" and that a "teacher carried her room to a picnic." Equally colloquial is the use of an indirect object, corresponding to the ethical dative in Greek, in such statements as: "They made them up a game," "I have me a dog," "I got me all dirty," "I killed me some rabbits," "Mother had us some ice cream," "He built him a house," "We planted us a garden." Other peculiarities are *tote, nary one,* and *nary nother.* Probably queerest of all to the stranger would be such expressions as: "I like to sunk," "I like to never find," "He liked to got killed," "He liked to kill him," "I liked to cry," "I liked to bust," "The auto liked to kill him."

These expressions have been quoted at length because the teachers seldom recorded them among the oral errors. Many of them are heard so commonly that they pass unnoticed. If the children are accustomed to these colloquialisms, what must be their reaction to the strange correct forms that confront them in their reading? We need to know more about the children's English. These errors appear with varying frequency in the papers from the different parishes. No one type of error is the most common in all the schools. In all of them some error in the verb form is among the most prevalent, but some errors in pronouns, prepositions, adjectives, adverbs, and redundancy may be equally frequent in a particular school or locality.

The average number of errors per child in each grade both for form and syntactical blunders is given in Table VI.

TABLE VI. AVERAGE NUMBER OF ERRORS PER PUPIL

	Grade					
	III	IV	V	VI	VII	VIII
Form Errors:						
Boys	14.2	14.4	13.6	11.9	11.0	12.0
Girls	13.7	12.2	12.4	9.8	7.4	8.5
Total	13.9	13.3	13.0	10.7	9.0	9.9
Syntactical Errors:						
Boys	3.0	3.3	2.8	2.4	2.7	2.5
Girls	3.3	3.5	2.7	2.6	2.6	2.1
Total	3.1	3.4	2.8	2.5	2.6	2.3
Total number of errors	*1782*	*1697*	*1848*	*1542*	*1013*	*736*

Several facts seem evident from this tabulation of averages and in connection with the foregoing tables. Since the papers of girls and boys were kept separate, it was possible to observe that no one error or type of error was distinctly typical of either sex. It was equally obvious that the girls' averages were almost uniformly lower than those of the boys and appreciably so in regard to form errors. They also showed a larger percent of gain with progress through the grades, whether this variance was due to difference in maturity or attitude or to both. It is also observed that the syntactical errors constitute less than 20 per-cent of these language errors. The increase in syntactical errors in the fourth grade may perhaps indicate that in some schools too many language difficulties are introduced at that stage. Otherwise the decrease in this type of error is gradual and consistent with school progress. In form errors there is a gradual decrease in the three lower grades and then a sudden drop in the sixth grade.

Many form errors may be due to carelessness, but the more fundamental ones are probably caused by lack of intelligence, confused thinking, and the want of connection between idea and expression. The importance of the latter possibility is strengthened by the fact that there is little decrease in the percent of error from the third grade to the eighth in (1) terminal period, (2) initial capital, and (3) wrong capitalization. The omission of

the comma of address and the confusion of singular and plural seem also to be as prevalent in the upper as in the lower grades. There is an increase from the third to the eighth grade in incomplete sentences and in the use of comma for period or period for comma, in the omission of the appositive comma and of the comma where it is very necessary for clear understanding. All these appear to be fundamentally caused by inability to analyze thoughts and to express them definitely. There is a decrease in the misuse or omission of the question mark, in the lack of capitalization of proper names, and in the frequency of "and" clauses. The importance of recognizing an error and of proper drill can be seen in the capitalization of proper names and the pronoun *I*. The decrease in the proper-name error was from 28 percent in the third grade to 2 percent in the seventh, and *I* was uniformly capitalized in the upper grades.

If the ten form errors that rank highest in the third grade are noted, it is found that nine of these are among the highest ten in every grade. The one exception is the lack of the terminal question mark. In the upper grades omission or misuse of the comma takes the rank position of this type of error. In scoring comma errors leniency was observed. Instances where its use was deemed essential were scored, but none was scored where it might be optional.

Seven of the ten syntactical errors most frequent in the third grade continue among the ten highest in all the grades. Misuse of pronouns and redundancy become more frequent in the upper grades than wrong use of adjectives, past participle for past tense, and incorrect sequence.

In general, this survey of language justifies the following statements. (1) The larger groups of syntactical errors hold relatively the same order in different localities, verb errors taking first rank, next pronoun errors, and next adjective-adverb confusion and redundant expressions. (2) Language errors of children are at least of two types, (a) those peculiar to the community and (b) those generally prevalent. Hence it is not prac-

ticable to limit language drill to a definite set of rules. A survey of all written work for two weeks will show concretely the specific abuses that must be remedied. (3) There are indications from this study that syntactical errors may be more readily combated than form errors. The latter, though apparently more simple, are perhaps to a greater extent correlated with mental ability and clear thinking.

Editorials

THE MASTER PROBLEM

We make progress only as we isolate and solve the problems which at any given time are critical for the situation in which we find ourselves. It is easy to find problems in need of solution. As one of our proverbs puts it, "A fool can ask more questions in half an hour than a wise man can answer in a lifetime." The difficulty lies in selecting the one problem whose solution is the key to further advance.

Education has been "long" on problems but "short" on genius to focus attention where it would do the most good. In spite of all our honest efforts and good intentions, the wheels of progress drag heavily in the sands of time. We have made progress, great progress—of a sort. Today we herd by force more children into school than ever before. We keep them there more years, more days in a year, more hours in a day than formerly. We have greatly diversified the subjects of study, have changed our methods of teaching, and improved the efficiency of many educational processes. We build wonderful children's palaces for schools, and we require more and more years of training of those to whom we entrust the care of our children. As for the children themselves, we examine them, measure them, test them, feed them, play them, project them, individualize them, socialize them, and graduate them in larger numbers than ever before.

Yet the world life still moves forward sluggishly. Ignorance, greed, hatred, disease take their annual toll. The great leader, the great statesman, the great artist, and the great inventor still arise by chance; and for hundreds with gifts of promise only one here and there succeeds in overcoming the obstacles which social inertia, convention, and selfishness now, as in the past,

throw in the way of genius. We preach eloquently of the wonderful mission of education and of its value to the individual, to the state, and to humanity. Yet striking advances are often made by those who attain to manhood without the benefit of the conventional education.

The fact is education is not merely inefficient, but—something far more serious—ineffective. Between theoretical achievement, actual hopes and aspirations, and practical realization the contrast is too great to be considered dispassionately. Cynical and bitter regret for wasted years is the net product of many a high-school and college education. Too often men value the incidental and concomitant experiences of college life far above the direct effects of classroom teaching. Our "progress" and our "success" too frequently crumble to dust even as we attempt to enjoy them.

The trouble is, of course, that in the past we have not found our master problem. Signs are not wanting, however, that the movement for the scientific study of educational problems is bearing fruit. Objective, analytical methods are developing; and we are beginning to map out more clearly the boundaries, at least, of our fields of ignorance. When measurement men constructed many tests for reading only to find little correlation between one reading test and another, healthy doubts and questions arose. The problem of validity then began to emerge. When tests supposed to measure adding ability proved, upon careful investigation, to measure only the motor elements of adding ability, validity rose to the dignity of a problem and a technique. The measurement man who preaches that every test must be proved to measure what it is supposed to measure is building better than he knows. His insistent questions, "How do you know?", "How do you justify?" have a wider application and a deeper meaning than those which he gives to them. How *do* we know, we teachers of children, that the tasks and stunts which we put the children through in the classroom are valid means for achieving the ends we desire? As long as the honor students in law, medicine, engineering, and teaching are

seldom the ones who win honors in their profession, isn't it just possible that either our means, or the ends at which we aim, are not valid in terms of life values? What is the use of doing efficiently that which is not worth doing? If scores in a test designed and constructed to measure spelling ability, and readily assumed to measure spelling ability by all who inspect it, can prove upon measured trial to correlate much more closely with children's marks in arithmetic than with their marks in spelling, may not many of our common assumptions in regard to goals, subject matter, and method of teaching be equally in error?

The law of the single variable demands that when a given effect is the product of two or more causes, judgment be suspended until the effect of each variable has been determined singly. The law of the single variable applies to classroom teaching. A true scientific attitude of mind will seek a complete, impersonal validation of every assumption, every technique, however simple and self-evident it may appear to be. Perhaps the problem of validity carried to its logical extreme and applied to the validation of educational objectives, means, and methods will prove to be the long-sought master problem in education

S. A. C.

Reviews and Abstracts

PENNSYLVANIA STATE DEPARTMENT OF PUBLIC INSTRUCTION. *Report of the survey of the public schools of Philadelphia.* Philadelphia: The Public Education and Child Labor Association of Philadelphia. 1922. 4 volumes, 1351 pp.

The survey of the public schools of Philadelphia, made during the school year 1920-21, was conducted by the State Department of Public Instruction under the general direction of the State Superintendent, Doctor Thomas E. Finegan, assisted by thirty-six members of the State Department and twenty-three other specialists. Dean John W. Withers of New York University directed the survey of elementary education, Doctor Thomas H. Briggs of Columbia University directed the survey of secondary education, and Superintendent H. S. Weet of Rochester directed the study of finance. The personnel of the survey staff included specialists of recognized standing in each important field of educational activity included in the survey.

The scope of the survey and the extent of its report preclude here any extended analysis of the findings and recommendations. The most that the reviewer can attempt is a very brief summary of the principal findings and limited comments on the method of the survey and its report.

The director of the survey states (p. 28 of Book I) that "it cannot be too emphatically stated that the general condition of Philadelphia's school plant is deplorable," and that "the most serious problem which the board faces is its building program." Of the 301 school buildings in Philadelphia 204 scored below 600 on the Strayer-Englehardt score card and only 11 scored above 800. To meet present needs and needs in the near future definite and detailed recommendations are made for (1) an immediate building program, the estimated cost of which is $8,522,327; (2) a five-year limit program, the estimated cost of which is $28,751,909; and (3) an increased population program to meet needs up to 1940, the estimated cost of which is $46,736,736—the total cost of financing the building program up to 1940 being estimated at $84,010,972. Readers of the *Journal of Educational Research* should be interested in the thorough-going scientific methods employed in analyzing the present school plant and in organizing the building program. It is a masterly piece of survey work along lines made possible by Messrs. Strayer and Englehardt in previous surveys.

Part I of Book II shows clearly that Philadelphia is badly in need of reform in the organization of its system of school administration. Recommendations properly urge the abolition of an obsolete Board of Visitors, the election of board members by popular vote at a separate election, and

recognition of the superintendent as the responsible executive officer of the Board.

The present relatively low status of the Philadelphia schools, especially on the material side of buildings and the physical plant, may well be due to the fact that the city ranks low in its financial support of education. When compared with twelve other cities of its class, Philadelphia was found to rank last in total expenditures, next to last in current expenditures, and second from the last in the per capita cost of schools. The present state of school buildings indicates that Philadelphia has failed properly to provide the necessary funds for maintenance and needed outlay.

In Part II of Book II are given extensive data concerning attendance and the progress of pupils through the grades. Especially interesting and valuable is the discussion of retention and promotion in Chapter II. In particular students of secondary education will find valuable the study of elimination, retardation, and promotion for high schools on pages 196 to 249.

Book III of the report contains a brief—and in the reviewer's judgment an inadequate—treatment of kindergartens, a brief retreatment of special classes somewhat lacking in concrete data, a chapter on continuation schools, also lacking proper statistical basis, a somewhat disappointing chapter on the junior high school, three chapters on the training, appointment, and qualifications of teachers, a somewhat over-extended chapter on industrial education (113 pages), and a didactic chapter on home-economics education. The best chapters of this volume are those on teacher training and teacher appointment. For some at least the conditions in the Philadelphia Normal School and in the School of Pedagogy cannot help but raise the question of policies in maintaining city training schools.

Book IV is devoted to reports on the organization, character, and results of instruction in the various fields of study. Those reports are of varying degrees of importance, interest, and merit. Especially worthy of attention are Chapter II on "Commercial Education" and Chapter IV on "Extra-curricular Activities."

The reviewer of a survey having the comprehensive scope necessary for a large school system faces a practically impossible task. Only those who have been responsible for surveys realize the conditioning factors involved and have intimate enough acquaintance with the situation treated to permit a just evaluation of a survey and its report. For that reason, the present reviewer approaches with misgivings critical comment on the Philadelphia Survey and its report.

First of all it should be said that the Philadelphia Survey must be considered as one of the best examples of modern school investigation. For the citizens of Philadelphia the survey has determined a condition of affairs probably not well realized by the people of that city. The report, obviously written with a purpose of presenting the facts clearly and definitely, should make clear the present merits and defects in the Philadelphia school system. Recommendations for the most part are soundly established on ascertained data, and in most parts of the report definite and detailed proposals are made

to remedy existing defects. The report should also prove extremely valuable to all interested in public school administration.

In a report of this sort there always arises the question of the form of presentation and publication. Those responsible for a survey report are forced to choose between a somewhat brief and simple presentation of the major problems couched in such form and so limited in extent that the general public may be expected to read and understand the report, or of making a somewhat extended account including all of the data upon which the findings and recommendations are based. One cannot help feeling that to the citizens of Philadelphia a report in 1,351 pages must prove forbidding. In the reviewer's judgment the problem of form for publishing survey reports has not yet been solved properly.

Another question of the form of report may be raised in connection with the Philadelphia Survey. Has not the time arrived when surveyors are justified in the omission of statistics which are largely in the form of "working papers"? Statistical data must be presented, but in the reviewer's judgment the time has come when the statistical material published in a report for public consumption should exclude statistical studies which are largely in the form of working data. Much of the statistical data presented in Book I might to advantage have been omitted, examples only of the statistical method being included in the case of each problem. To an extent, also, his criticism would appear to hold with some of the material presented in Book IV, i.e., Tables 16-19.

These comments concerning the presentation of statistical data do not mean any criticism of the statistical method employed. That is always to be commended and is inevitable in any scientifically conducted survey. It does mean, however, that much of the statistical material usually presented in survey reports might better be omitted from the report but placed in the hands of the superintendent to be brought to the attention of those in any case primarily concerned.

ALEXANDER INGLIS

Harvard University

STRONG, EDWARD K. and UHRBROCK, RICHARD S. *Job analysis and the curriculum.* Baltimore: Williams and Wilkins Company, 1923. 146 pp.

This text is of significance to those who are interested in the objective determination of curricula because the authors have taken the printers' vocation and made a job analysis of executive positions in the printing trade to derive a curriculum from the duties so ascertained.

Specifically, the methods of job analysis have been worked out in sufficient detail to be of use to school men who are interested in studying the technique. Ninety-four executives in ten different printing establishments located in two large cities were interviewed and their duties listed. Nineteen executive positions are represented and the duties obtained in connection with each are presented in detail.

The steps followed in constructing a curriculum on the basis of these duties are outlined and as a result twenty-four courses are listed. In connec-

tion with each course examples are given of the use that is to be made of the material of the course with a view to showing what should be treated in the course. For example, the general procedure can be illustrated from accounting. In accounting, as in each of the other courses, the objective of the course is stated and some description of what should be included within it. "It is recommended that accounting should involve, among other things, training in financial and cost accounting and analysis of the organization of the accounting department and the relationship of this department to the other departments in so far as may be necessary for the proper distribution of labor and material charges." Examples taken from the job specifications are presented in each case as detailed illustrations of the kind of thing that needs to be stressed in the course.

The curriculum is carried through to the point where a schedule of courses is presented for use in Carnegie Institute of Technology. This is a significant pioneering investigation and will be of great use to those who are interested in school curricula. It presents the objective method of curriculum construction in unusual detail.

For the assistance of those who are learning the technique of curriculum construction it may be wise to point out a few limitations which are due to the fact that it is a pioneering study. In the first place, the traits which are possessed by successful executives and which should, therefore, be the ideals of those who intend to follow the vocation are not included. In the second place, the job analysis was carried on only to the extent where the investigators felt that they could merely present examples of duties and specifications. The investigators do not feel that it includes all the duties. It would be desirable in future studies to have a more exhaustive analysis. There is still a considerable amount of the subjective element in their curriculum; but I do not see how this could well be avoided in a first attempt. Because the duties were not completely determined in great detail it was necessary to fall back upon committees of instructors in related courses to agree upon the outline of the content and leave to the individual departments the constructing of the intra-department courses along the lines laid down. When the objective method has been quite perfected in succeeding years, it ought to be possible to determine the details of each unit of the course of study in the research laboratory.

In spite of these limitations the study is a major contribution to the problem of curriculum construction.

W. W. CHARTERS

Carnegie Institute of Technology

PRINGLE, RALPH W. *Adolescence and high-school problems.* New York: D. C. Heath and Company, 1922. 386 pp.

> This book had its origin in a course which was organized a few years ago for prospective high-school teachers and principals . . . . The aim has been to produce a book that will be helpful to any one who expects to do high-school work and to all others who are responsible for the welfare of adolescents . . . . The book is based on more than twenty years' experience as principal of public schools

> and nine years in training young men and women for high-school positions . . . . The plan of the book is simple: it attempts to describe the nature of boys and girls of high-school age; then, in the light of this knowledge of adolescence, it seeks solutions for various problems growing out of high-school teaching and management. No attempt is made to deal with teaching problems as such.
>
> —*Preface*

The author does not presume to say the final word on these subjects. He recognizes that while the present conditions are changing, suggestions for the solution of the problems of the adolescent for to-day will apply equally well for the immediate future. Although the author does not claim to include all the problems, the table of contents reveals that most of the vital problems are included in the book.

"Methods of Solving Educational Problems" and "Preadolescence" are treated in the first two chapters. The remainder of the book is divided into two parts. In Part I, "The Psychology of Adolescence" is treated in one hundred pages including the physiological, mental, social, and moral development of this period. Part II, the major part of the book consisting of two hundred and fifty pages, is given to "High-School Problems" in which the psychology of adolescence is related to the specific problems of the secondary school. Some of the problems discussed are: the junior high school, the curriculum, social activities, debating, athletics, high-school journalism, importance of the assembly, sex education, moral education, honor system, and leadership.

The eighth chapter is entitled "The Transition to the Secondary School." It contains, in fifty pages, one of the best discussions of the junior high school in the literature of secondary education. The many arguments in favor of the junior high school are admirably summed up. Some of the many problems discussed are: methods of securing qualified teachers, the departmental plan, promotion by subjects, directed study, requirements for admission, housing facilities, the cost of maintenance, and scientific grouping of pupils.

This chapter is closely connected in subject matter with the tenth chapter which is devoted to the curriculum. Much space is given to the history or evolution of the curriculum and not enough to its scientific or philosophical aspects. The scissors-and-paste method of making a curriculum will soon be a thing of the past among leaders in secondary education. Too long have the individual tastes of the principal or those of the most influential teachers been the determining factors in making the curriculum. This does not mean that the principal and his teachers should not make the curriculum—no one else should make it; but it should be determined by the objectives of secondary education. "The objectives must determine the organization, or else the organization will determine the objectives." This chapter would be much more helpful if the outlines given in the "Cardinal Principles of Secondary Education" had been used.

In connection with the excellent treatment of the socialized aspects of the school, the author might have emphasized some of the more recent activities, such as student cooperative government, cooperative and directed

study, and vocational educational guidance. Of course we realize that many subjects must be omitted or their treatment will be unsatisfactorily curtailed within a volume of less than four hundred pages.

Parents, teachers, and students of secondary education will find much helpful and suggestive material in this book. "The author," as stated by Doctor Lotus D. Coffman in the Introduction, "maintains that everything the student does, every experience he has, every relation he establishes, every contact he makes, has its educational implications, and rightly so."

EDWARD RYNEARSON

Pittsburgh, Pennsylvania

MOORE, ERNEST C., ed. *Reports of Committee on minimum essentials in elementary education.* New York: The Macmillan Company, 1922. 402 pp.

Early in 1918, the Superintendents of selected cities and towns from the twenty-one counties of Southern California met at Los Angeles in conference with the faculty of the Southern Branch of the State University of California, "to consider ways and means of improving the schools." This group undertook to construct a course of study that should discard the merely traditional and so eliminate unnecessary waste from the classroom.

The writer and his classes of advanced students in the curriculum have gradually worked out during the past nine years a set of standards for judging courses of study. At present these standards require:

1. The course of study should rest squarely on the general aims of education and the specific needs of the community. As the upper grades are reached, efforts to meet community needs should become more and more specific. 2. Each subject should have a definite purpose in terms of specific aims properly related to the general aims of education and the community needs. These aims must be evident in the details of the course. 3. There should be a time schedule showing proportion of total school time to different aims and to specific subjects and parts of subjects, with provision for modification under varying conditions. 4. Under each subject (or general aim) there should be a statement of grade objectives, grade standards, minimal work for all, extra opportunities for the brighter pupils, optional work under certain conditions. 5. The traditional and useless should be definitely designated for elimination. 6. Methods should receive attention in each subject at least to the extent of showing and emphasizing proper socialization of all work, proper motivation of all work, the appropriate teaching technique (drill, appreciation, problem, or project). 7. Preferably also there should be rich suggestions on methods, devices, large questions, problems, projects, etc., and these suggestions should be specific, including actual illustrations of good classroom work. 8. There should be large teacher participation, insuring necessary grade adaptation and other evidences of real usefulness in the classroom. 9. There should be evidence of community cooperation sufficient to insure the use of local educational data and opportunities; the solution of community problems in language, arithmetic, reading, hygiene, home economics, and industry; and the preparation of pupils for social and economic

participation in the community. 10. There should be pedagogical and subject-matter references for both teacher and pupils.

Applying these standards to the Minimum Course only makes the superior character of the undertaking more evident. Standards 1, 2, 7, 8, 9, and 10 are well illustrated in the course as a whole and in most of the subjects.

The course is broad, not narrow and threadbare. It includes not alone the three R's, not alone the eight common branches. Physiology is replaced by hygiene and physical education is added. Geography and history are supplemented by civic and social education. Community industries are emphasized through home economics, industrial arts, manual arts, nature study, and agriculture. Music and art receive proper attention, and the art work is made functional in home, dress, civic problems, and commerce, as well as broadly cultural. Evidently the broad aims of education and the community needs have been carefully balanced in the course as a whole.

The aim of each subject is carefully stated and then, for the most part, kept carefully in mind in working out the details of the course in the subject. "Arithmetic is a tool to be used in the affairs of everyday life." In art the aims are: To develop appreciation for and joy in beautiful things; to stimulate the demand for better design and color in the home, dress, commerce, etc.; and to develop ability to express one's ideas in visible form. The aim of civic and social education is "to teach the child to assume the responsibilities of active citizenship." And so on for other subjects. Standard 2 is well observed.

Although the difficulties of teacher and community participation are increased by the size of the unit (21 California counties), these points are unusually well observed. Nearly two hundred classroom teachers organized into seventeen committees prepared seventeen subject reports, tested them out for a year, and then revised the work for final publication. Community participation was secured in several of the subjects through the medium of questionnaires. Thus are the requirements of standards 8 and 9 fulfilled.

Standard 10, calling for helpful references, is well observed. The pedagogical references are unusually well selected, although there are occasional omissions. One of the most complete studies in arithmetic is not mentioned. In reading, notable omissions are the studies of Dunn, Bamberger, Buswell, Schmidt, and C. T. Gray. The pupil lists in reading and literature are unusually helpful.

The omission of a time schedule as called for in Standard 3, is a serious defect. No course of study should be offered without at least a tentative suggestion as to the proper division of time among subjects, parts of subjects, and larger aims.

There are many minor details to commend—the 39 arithmetic eliminations, the practical nature of the art work, the emphasis on language and right language habits, the reduction of specific history dates to 22, the fine positive program in hygiene and physical education. The industrial arts program is meager but very definite and excellent; it is not impossible; it should commend itself to all readers.

The attention to methods as called for in Standards 6 and 7, varies in different subjects, from almost nothing in spelling and arithmetic, to the fairly adequate treatment under art.

Particularly commendable are the statements of curricular development in connection with the various subjects, especially arithmetic, spelling, language and grammar, and history. The references give help on this point in other subjects.

Mention should be made of the professional guidance evident in the course. Dr. E. C. Moore, a specialist in education, headed up the work. Fourteen of the seventeen committee chairmen were from the faculty of the Southern Branch of the University of California. Such expert leadership is commendable, but in this case it is properly balanced by teacher participation, thus insuring detail and adaptation as well as breadth and viewpoint.

The work will be helpful to superintendents and teachers. It will be useful in college and university classes on the curriculum.

G. M. WILSON

School of Education, Boston University

RACE, HENRIETTA V. *Improvability: its intercorrelations and its relations to initial ability.* (Teachers College, Columbia University Contributions to Education, No. 124) New York: Teachers College, Columbia University, 1922. 68 pp.

The modern practice of attempting to measure the effects of teaching effort by means of standardized tests, makes the whole problem of improvability of great importance to the classroom teacher. The problem is stated by the author as follows: "How much unity and how much specialization is there in the learning process? A second problem, developing from the first, is the relation of improvability to initial ability, and a third, the relation of improvability to general ability.

The author gives a brief summary of the various studies that have been made on each of these problems. These studies, in general, seemed to indicate first, that improvability was specialized, that is, that improvability in one subject differed greatly from improvability in another subject for a given individual: second, that those who had the greatest initial ability were the ones who improved the most with practice: third, that children of average ability improve more rapidly in school subjects than children of the subnormal group.

In carrying on this study, three groups of people took part, college students, children of superior ability, and children of average ability. The numbers used were small. There were 95 of the first group, 43 of the second, and 172 of the third. The test and practice materials used, together with the detailed procedure followed, are carefully described. Tables presenting all data are given, enabling one to make his own deductions if he questions the conclusions drawn by the author.

The practice material for the Group I consisted of problems in addition, multiplication by substitution, and cancellation. Groups II and III used (a) addition of one figure numbers, (b) multiplication by substitution, (c)

language completion, (d) reasoning processes in United States history, and (e) Section I, Part I, of the Thorndike Intelligence Examination for High School Graduates.

In reporting the results of this experiment the author says regarding problem one, that "in general, the correlations between gains fall far short of 1.00 and seem to be little if any higher than the corresponding correlations between measures of status would probably be." However, she calls attention to the fact that the groups are highly selected and homogeneous, which would probably lower the coefficients—also that some individuals of the group had reached a point of attainment on the given scale which caused their gross gain to be small, since they were approaching the limit of efficiency in that function. Summarizing, she says "improvability is specialized. Different mental functions show different degrees of learning. While the rapid learner in one field learns rapidly in all fields, his improvement is greater in some functions than in others."

As to the second and third problems the following statements are made: "In the relation of improvability to initial ability in the function itself, we find that the measure of initial ability is a measure and a prophecy of improvement, that native capacity in any function determines what shall be accomplished by that function." "In the relation of improvability to general ability, the more superior the general intelligence, the more significant the learning process."

The book contains a good bibliography of articles dealing with the three problems studied in the experiment.

ARCH O. HECK

Director of Research, Public Schools, Akron, Ohio

REPORT OF THE CONSULTATIVE COMMITTEE. *Differentiation of the curriculum for boys and girls respectively in secondary schools.* London: H. M. Stationery Office, 1923. 193 pp.

The education of girls and women in England is passing through the same stages of evolution that are found on this continent. There, as here, the idea of the inferiority of women in school subjects has given place to the idea of equality. They know, as we know, that girls can make at least as good grades in so-called boys' subjects as can the boys themselves. And they are now concerned, as we are, with the problem of determining what differentiations should be made between the education of boys and men on the one hand and girls and women on the other hand.

Of timely interest, therefore, is the appearance of the report of the Consultative Committee which "sat on 39 days and examined 72 witnesses" as a full committee, besides meeting on six days as subcommittees. The witnesses were, with the exception of eight, "practical" school men and women, such as inspectors and head masters and mistresses. Five members of the medical profession were interviewed, one professor of psychology, and one professor of education.

The historical section of the report describing the evolution of the curriculum in boys' schools and in girls' schools in England constitutes about

one-quarter of the material. This portion of the report will be of interest to students of comparative education.

The second section describes the present curriculum and enumerates the criticisms of the curriculum presented by the witnesses. These have a familiar ring for American school men. The English curriculum is too academic, too rigid, too heavy, especially for girls. Too little attention is paid to aesthetic interests and subjects. The curricula for girls are modelled too closely after those for boys, domestic subjects are not emphasized, and the competitive principle is too intensely applied.

In the third section, the committee has gathered together the differences between adolescent girls and boys, anatomical, physiological, psychological, and social. This is the hub of the report and is moderately complete. Some of the American material upon the subject is included, but not as much as is available. Comparisons of school achievements of boys and girls are given largely in the form of opinions of the witnesses rather than by a statistical display of grades.

The fourth section reviews the materials collected and presents a series of recommendations. The first group of these presents a plea for greater freedom in the curriculum for both boys' and girls' schools. In so far as differentiation is concerned, the committee is clearly of the opinion that girls must be safeguarded against fatigue. This seems to be the outstanding difference between the sexes and appeared continuously in the investigation. The greater docility, conscientiousness, physical weakness, and emotional unbalance of girls as contrasted with boys, constitute in the reviewer's mind the basic differences growing out of the report.

The report of the committee is interesting to students of the curriculum. It is particularly interesting for the reason that it shows the paucity of information available for use as a basis of differentiation between the education of adolescent boys and girls. It is interesting also because it has gathered together the essential, known, scientific facts and supplemented them by a comprehensive body of "practical" opinions gathered from administrators and teachers in close contacts with boys and girls in school life.

University of Pittsburgh W. W. CHARTERS

YATES, DOROTHY HAZELTINE. *A study of some high-school seniors of superior intelligence.* Bloomington: Public School Publishing Company, 1922. 75 pp.

The author studied "intensively a group of young persons of superior intelligence in order to determine group tendencies with regard to (1) heredity and home conditions, (2) health and physical development, (3) mental development and educational progress, and (4) kind and number of interests."

Mental tests were used (1) to locate the twenty-five brightest seniors of the Oakland high schools, and (2) to select twenty-five seniors of average intelligence for a "control" group. The author studied the high-school records of each pupil; interviewed the teachers for an estimate of each pupil's intelligence, and of various mental, moral and physical traits; and made home

visits to determine each pupil's family history, pedagogical record, physical and mental development, interests, special abilities, etc., etc.

Just as far as possible all information was gathered in such a way as to permit of objective statement and evaluation. Among the results of the study are found such as the following: Considering the home environment in its total aspect there is practically no difference between the two groups; the superior children cut their first teeth, learned to walk, and reached physiological maturity earlier than the control group; there was an average acceleration of six months among the brighter pupils in speech development; the brighter children showed decidedly greater ability, precocity, and spontaneity in the early learning process and were conspicuously self-helpful in learning to read; the brighter young people were more interested in school and were much more interested in objective things and activities, in sports and athletics, in music, and in people and social situations; art is the only field in which the duller group had the advantage.

Some of the conclusions and recommendations are: The right kind of teacher will not waste the child's time on unessentials or in unimportant routine; one essential of any good pedagogy is knowing when *not* to interfere; it is unfortunate in one way that bright pupils weather pedagogical mistakes so well, for we are tempted to think that there are none; superiority is conspicuous for its complexity.

The author's high appreciation of the limitations of all the methods employed has enabled her to present a comprehensive analysis of her problem, wherein she has taken care to check and verify from several angles the various features of the comparisons revealed by her data. This is an exceptionally thorough-going investigation which reveals and studies the facts of children's lives outside of school as well as within, and outside of as well as on tests.

Indiana University H. H. YOUNG

News Items and Communications

This department will contain news items regarding research workers and their activities. It will also serve as a clearing house for more formal communications on similar topics, preferably of not more than five hundred words. These communications will be printed over the signatures of the authors. Address all correspondence concerning this department to Doctor E. J. Ashbaugh, Ohio State University, Columbus, Ohio.

Did you know that an average of one schoolhouse burns down every day in the United States? It is said that this is largely due to lack of fireproof construction.

Under a plan being considered by the New York City board of superintendents a modified course, adapted to slow or "dull-normal" pupils, is to be offered in the high schools as well as in the elementary schools.

We congratulate Superintendent Newlon as he enters upon the first year of the five-year period covered by his new contract with the Denver Board of Education. The nature of the contract makes it a signal expression of confidence in Superintendent Newlon. It is not always that a man's local success corresponds so closely to the estimation in which he is held abroad.

The fourth annual educational conference of the Ohio State University will be held on April 3, 4, and 5, 1924. The general topic for the conference will be "Standards in Education." At the general session this topic will be given a broad and inclusive treatment. At sectional meetings, of which there will be between twenty-five and thirty, the conference topic will be given specific applications.

Another of America's distinguished sons has gone abroad to study statistics. Karl J. Holzinger of the School of Education, University of Chicago, has followed Professor T. L. Kelley's example and has become a student under Karl Pearson at the Biometric Laboratory of University College, London. If it is not too much in the style of the country newspaper, we should like to say "Good luck, Karl."

During the war a number of states and many cities forbade the teaching of German in their high schools. We learn that this summer the California legislature lifted the ban. For some time California and Indiana were the only states in which German could not be taught in the secondary schools. The privilege was also restored in Indiana by the 1923 legislature. Accordingly, no state now prohibits the teaching of this subject to high-school students.

We often hear of the student who gets nothing but "A" grades in his work. In fact we hear about him a great deal oftener than we see him. It is worth knowing how often he really takes place. Dean Rothrock of the College of Arts and Sciences of Indiana University has recently reported on the number of students who maintained the standard of "A" during the past year. The number amounted almost exactly to one percent of the student body. We may therefore expect this *rara avis* to put in an appearance about once in a flock of a hundred.

The Bureau of Educational Measurements and Standards of the Kansas State Teachers College, Emporia, has been asked to direct an intensive mental and educational survey of the girls in the Kansas State Industrial School at Beloit. The work will be under the direct charge of Mr. D. A. Worcester, Director of the Bureau. Mr. Worcester's ability is being recognized outside the borders of his own state as is evidenced by his having been booked for a series of addresses at the New Mexico State Teachers Association in November.

Our readers will be interested in the new periodical issued by the faculty of the George Peabody College for Teachers. It is called the *Peabody Journal*

of Education. The first issue is dated July, 1923, and the second issue will appear in September. In other words, the periodical will be published bi-monthly. We have read number one with a great deal of interest; so much so in fact that in bidding the new Journal welcome to the fraternity of educational periodicals we can think of no better wish for its prosperity than that it may never issue a number inferior to its first.

We read that the gifts of Yale alumni to the University during the past year reached a total of nearly half a million dollars. It seems to be the fashion for classes having reunions at commencement time to give the University a thousand dollars for each year that has elapsed since their graduation. When we read of things of this sort, we wonder why it is that the alumni of privately endowed institutions come forward so handsomely in support of the institution while those of State Universities do so little. Is there wrapped up somewhere in this the notion that what a man pays but little for he values correspondingly?

Two new English composition scales have recently been issued by the World Book Company. One is by Professor M. J. Van Wagenen, of the University of Minnesota. By it compositions are rated on the three elements of thought content, structure, and mechanics. Separate scales are presented for exposition, narration, and description. The other is by Superintendent E. E. Lewis, of Flint, Michigan. It is designed for measuring business and social correspondence. Separate scales are provided for measuring ordering letters, letters of application, narrative social letters, expository social letters, and simple narration.

It is reported that the all-year high school of Newark, New Jersey, had 127 graduates last August. Principal Wm. Wiener reported that besides regular full-time students there were also a number of so-called half-time pupils who worked half a day and went to school half a day. Principal Wiener thinks this arrangement secures better educational results than alternating weeks or fortnights. The school day was from 8:20 to 4:10 with teachers working all day. The all-year teachers of whom there were 75 received one-sixth more salary for the extra two months.

Professor R. L. Morton, Ohio University, Athens, Ohio, contributes the following note regarding "Practice Tests in Fractions" by Edward Wildeman (published by The Plymouth Press, Chicago, 1922): "The author's idea that pupils need regular, systematic drills in fractions is excellent. The use of the Courtis and Studebaker material in hundreds of schools has demonstrated that. The exercises, however, include fractions that are of infrequent occurrence. such fractions as 11/18, 17/20, 11/24, 5/21, and 13/21 very rarely occur in the everyday experiences of children or adults. Assuming, however, that the time limits for the various grades have been scientifically determined, the exercises are to be commended, with the exception just noted.

Dr. Thomas E. Finegan, former Commissioner of Education of Pennsylvania, in a recent address before the Conference of Executives at New York University, emphasized the well-known fact that states do not offer equal educational opportunities to urban and rural children. Practically every factor making for efficient education, he said, such as attendance, length of school year, course of study, buildings, and playgrounds, as well as teachers is superior for city children as compared with rural children. In the course of his remarks on attendance, Dr. Finegan made the statement that in the United States last year five million pupils, or more than the combined school registration of the New England States, New York, and Pennsylvania, were reported out of session.

The *New York Evening Mail* of July 31, 1923, reports that William B. Ittner, school architect of St. Louis, declared at a conference on school buildings at New York University that no more than 35 pupils should be accommodated in the normal elementary-school classroom. We wonder how Mr. Ittner knows. A great many superintendents and students of education have been apparently doing a lot of needless worrying about this matter. Mr. Ittner, if he is correctly reported, seems to have a solution of the problem. He owes it to the perplexed educators to disclose the basis of his conclusion.

The annual conference of New Jersey school men was held at Rutgers College, New Brunswick, during the early days of August. Among the speakers were: Doctor John Enright, state commissioner of education of New Jersey; Doctor Zenos E. Scott, superintendent of schools, Springfield, Massachusetts; Doctor Augustus O. Thomas, state commissioner of education of Maine and organizer of the recent international meeting of educators at San Francisco; Professor N. L. Engelhardt of Teachers College, Columbia University; Superintendent Ira T. Chapman of Elizabeth, N. J.; and Doctor L. L. Jackson, assistant commissioner of education of New Jersey.

Teachers of the domestic arts will be particularly interested in the new form of the Murdoch "Sewing Scale" which is just published by the Bureau of Publications, Teachers College, Columbia. The new form, called the "Murdoch Analytic Sewing Scale for Measuring Separate Stitches," is a single folder in place of the many single sheets of the old form. It contains pictures of five samples, in varying degrees of quality, of the five principal types of stitching—running, combination, backstitch, overcasting, and hemming. The samples of each type are arranged in order of quality and are assigned definite values. The directions for scoring are so simple and carefully devised that any pupil can score her own work with a fair degree of accuracy. The new scale is certainly an improvement over the old form.

The Educational Research Club of Cleveland has grown to be a real working body. It now has 83 active producers. Last year it met once a month, and at each meeting two researches by members were read and criticized. Some of these papers are coming forth in the national scientific journals of

education. At the June meeting it was voted by the club to divide itself into two sections. The vice-presidents, elected as chairmen of these two sections, are Principal Wm. Connor of Longwood High School of Commerce and Dr. Bertha Luckey, director of the Clinic of the Board of Education. J. Carleton Mann, director of Reference and Research, was elected secretary, and Dr. Garry C. Myers was re-elected president.

Every member who joins this club does so with the understanding that he is to make an early contribution in research. It is not a mere listening club. Workers only are welcomed into membership.

An attractive pamphlet of twenty-nine pages entitled *Digest of a Study of Public Education Cost*, has lately been issued by the Chicago Association of Commerce. It is characterized in the main by the extent to which large masses of detail have been condensed into general tables, graphs, and statements. The data refer not only to Chicago, but quite as much to Illinois and to the country at large. At the end, under the general heading of "Opinions," a number of quotations from educational people are included.

In its foreword the Association's committee on education says, "The facts which the study has revealed so far would seem to indicate that the citizens of the United States will have to consider limiting expenditures for some branches of public education, and possibly changing some forms of taxation, as well as otherwise modifying our Public Education Policies in order to place it on a sound and practical basis. Under no circumstances, however, should genuine educational efficiency be impaired at any point."

Dean Ambrose L. Suhrie reported last summer at the Conference of School Executives held at New York University concerning the plan in operation at his school whereby students in training to become teachers rate each other on characteristics regarded as valuable for teachers to possess. Dean Suhrie, after pointing out the emphasis which was placed upon personal fitness in the admission of students, showed how this emphasis was carried over into the work of the school. In addition to the ratings made by the students of each other, the members of the faculty are required to estimate the personal qualifications of each candidate for entrance into the teaching profession. As to the student ratings, six groups of qualities are recognized and clearly defined. They are: (1) sympathy, fellow-feeling, cooperative spirit; (2) trustworthiness, honesty, sincerity; (3) leadership, initiative, originality; (4) self-control, moral courage, strength of character; (5) open-mindedness, fairness, judgment; and (6) faith, optimism, enthusiasm. This mere list of characteristics does not at all convey the richness of content which the definitions, descriptions, and examples under each unmistakably reveal.

A significant type of course has been developed at some of the summer sessions of teacher-training institutions. There has been an increased demand for the services of important educational people—people who are outstanding leaders in education. Such people, however, cannot usually be secured for the full length of a summer session. Accordingly, we have the joint course given

by several teachers—a course which provides for classroom service ranging from a day to a week for each teacher. The difficulty in the operation of such a course is always the matter of giving it unity, organization, and point. This is ordinarly accomplished by carefully planning the work ahead of time, by requiring the submission on the part of the cooperating teachers of outlines for distribution to students, by providing a method of reporting during the classroom lectures and discussions, and finally by arranging with each cooperating teacher to furnish test materials to cover the subject matter which he has treated.

No doubt a great many joint courses were offered last summer. Two have come to our attention. One of these was at New York University and the other at the University of Pittsburgh. The course at New York University covered six weeks, and was under the immediate direction of Dean John W. Withers. The cooperating teachers were: Superintendent Frank W. Ballou, Washington, D. C.; Superintendent Herbert S. Weet, Rochester, New York; Superintendent Frank Cody, Detroit, Michigan; Superintendent David P. Corson, Newark, New Jersey; Dr. Thomas E. Finegan, formerly state superintendent of public instruction of Pennsylvania; Dr. Albert B. Meredith, state commissioner of education, Connecticut; Mr. William T. Ittner, school architect, St. Louis, Missouri; and Dr. Ambrose L. Suhrie, dean, School of Education, Cleveland, Ohio.

The course at the University of Pittsburgh likewise covered six weeks, although it was broken into two halves, one devoted primarily to administrative problems, the other to those of supervision. Professor S. B. Davis was director of the course. Cooperating teachers were: Professor Fred Engelhardt of the local staff; Mr. Hubert Eicher, Bureau of School Buildings, Pennsylvania State Department of Public Instruction; Dr. B. R. Buckingham, Ohio State University; Superintendent James H. Van Sickle, Springfield, Massachusetts; Dr. Edward L. Thorndike, Teachers College, Columbia University; Dr. Ambrose L. Suhrie, Dean, School of Education, Cleveland, Ohio; and Dr. Albert L. Rowland, Director, Teachers Bureau, Pennsylvania State Department of Public Instruction.

The organization of such courses as these seems to go a long way towards solving the difficulty of obtaining the type of men who are most wanted at summer sessions. These men are ordinarily too busy or too definitely committed to other institutional connections to permit them to spend the entire summer session away from their regular activities. Almost any man, however, can get away for a few days or a week and if a group of men is carefully selected with reference to special points of view, there is no reason why a highly effective course may not be offered. Much depends, however, upon the organization that is put into it and the extent to which it is supervised by the local staff.

Dean George E. Walk of Temple University, Philadelphia has given us permission to inform our readers of the use to which the *Journal of Educational Research* is being put in a course in "Individual Research" at that institution. This is a graduate course, and special effort is made to attain the

so-called scientific attitude in order that students may gradually familiarize themselves with scientific technique. In order to do this, Dean Walk says: "The *Journal of Educational Research* naturally suggested itself as a medium appropriate to the end desired. Its reported investigations cover a very wide range, and bear the mark of authenticity. They are short enough to serve the purposes of class interpretation and discussion, and comprehensive enough to introduce the student with sufficient thoroughness to the general field of the problem treated. Each student was required to present in class an oral critique on some one investigation printed in the *Journal of Educational Research*. This critique was organized according to a definite outline embodying such points as an explanation of the nature and scope of the problem treated, review of previous investigations, practical importance of problem, method of collecting facts, method of scoring, interpretation of data presented, summary or conclusion, and suggestions for application. The student was thus held responsible for a constructive estimate of the investigation reported, and this practical demonstration of his ability to handle the tools of research was considered an important index to his general fitness for pursuing graduate study. In cases where one such demonstration was unsatisfactory, another one was required."

Assistant Superintendent Charles D. Dawson of Grand Rapids, Michigan, collected data on the so-called "school fads" from 36 cities of about 100,000 to 250,000 in population. An attempt was made through a questionnaire to discover the extent to which cities of this class were providing special schools, special rooms, or special classes for atypical children; were engaging in activities other than academic in the regular schools; and were making provision in the school budget for extra-school activities. On the basis of the reports it was found that 26 of the 36 school systems are providing special instruction for either the mentally defective or the backward children, 25 of these providing special instruction for both. Fifteen state definitely that special instruction is provided for the bright child. Thirteen give special training to children with special defects. Thirteen give special instruction to the deaf; 12 have special classes for those with defective eyesight; 5 care for crippled children; and 11 mention other types such as open-air classes for anemic and tubercular children.

Practically every school provides for the teaching of art, music, physical education, and manual training, in the grades and in high school. Only eight provide especially for agriculture, though others handle it in connection with general science, school gardens, or high-school botany.

Provision for evening schools is made by 35 of the 36 cities, and 34 of the 36 make provision for Americanization work for foreigners, either as a part of the evening-school organization or by special budget. Fifteen school systems put money in their school budgets for social center work.

Bulletin No. 55 of the Bureau of Educational Reference and Research, University of Michigan, is devoted to the results of first-year tests in English in the high schools of Michigan. The tests under consideration were, Briggs

English Form Test, Kirby Grammar Test, Van Wagenen Reading Scale, and Carr English Vocabulary. The findings are summarized as follows:

1. The standard of achievement in English in grade IX in these high schools of Michigan is as high as is usually found elsewhere.

2. While the standard of achievement is as high as elsewhere, the students have not shown sufficient mastery of the subjects to warrant the teachers neglecting in their regular instruction any phases of the particular subjects measured.

3. Teachers of rhetoric and foreign languages must not assume that pupils have mastered the fundamentals of English grammar, but they must accept the teaching of the fundamental principles of the subject as a definite part of their regular work.

4. Instruction in how to read should be emphasized in connection with the teaching of subjects in the high school.

5. Certain school systems, where the standard of achievement in reading is low, should make a special investigation of the reading attainments in the elementary school.

6. The standard of attainment of students graduated from the rural schools is not as high as the standard of those graduated from the city schools.

7. Different phases of the teaching of English should be emphasized in high-school teaching, for the tests indicate that students may be good in one phase of a subject and poor in another.

City School Leaflet No. 5, Department of the Interior, by W. S. Deffenbaugh is devoted to *Research Bureaus in City School Systems.* In his introductory paragraphs he points out that "Just as no business can be managed successfully without accurate and ample information, so no school system, whether it be a village or city system, can be efficiently managed unless the board of education and the superintendents of schools base their opinions upon facts of various kinds.

"So complex have city-school systems become, especially those of medium and large sized cities, that superintendents of schools can not themselves collect and compile the data needed for their own and the school boards' guidance. As a consequence, many boards of education in the large, and some boards in the small, cities have organized departments or bureaus of educational research to collect and compile data regarding practically every phase of their respective school systems.

"Today 45 city-school systems report that they have research departments, and there are no doubt others that have not reported. Every progressive school superintendent, even if he has no regularly organized research department, is attacking his problem in a scientific manner by having the supervisors, principals, and teachers prepare data for his guidance. He is in some way securing the necessary information. But no doubt the most economical way is through an organized research bureau."

A somewhat detailed analysis of the staff and scope of work in bureaus of the larger cities of the country is given. Most of these bureaus are pub-

lishing reports on various phases of their activity, and these are usually available to research workers anywhere upon application.

In the March issue of the Journal note was made of a county contest conducted in Cloud County, Kansas, last year, and in the April issue attention was called to a state contest conducted in Colorado. Kansas also conducted a statewide contest last spring, information about which had not been received at the time the Colorado contest came to our attention.

In order to lend further support to those who are attempting to popularize contests we give in some detail the results in Kansas.

An invitation was sent out in November and the contest was held on April 28. Pupils to the number of 263, representing 26 schools well distributed over the entire state presented themselves, defraying their own expenses at the time of the meet. Three contestants were allowed from each school and no individual was permitted to enter in more than three subjects. Large loving cups were given as awards to those schools winning the greatest and next greatest number of points, and smaller cups were given to individuals who won first place in each event. There were silver and bronze medals for second and third places respectively. Fourteen of the 26 schools participating placed. One school having an enrollment of 62 pupils sent two representatives, one of whom entered in one subject, the other in two. This school took a first and second place. First place among the schools went to Kansas City which sent a representation of five; and second place to Colorado, with thirteen representatives.

The subjects of the contest were: Latin 1, plain geometry, solid geometry, Spanish 1, French 1, manual arts, English, extemporaneous speaking, world history, American history, domestic art and science, civics, physics, general science, and typewriting.

We have also learned that Nebraska conducted a similar contest during the past year; but we have received no details concerning it.

The Accounting of Public School Expenditures in the public schools of Wisconsin is the title of a mimeographed study by John Guy Fowlkes, assistant professor of education at the University of Wisconsin. Data were secured from the reports of city superintendents to the State Department of Public Instruction. The conclusion reached by the author is the great need for a uniform system of accounting and the harmonizing of the items contained in such a system with those required on the blank of the State Department.

Of the 63 items provided in the blank used by the Department for the school year 1921-22 only seven were filled out by the 86 cities. These were for the board expenditures; officers for the control of buildings and supplies; total under general control; salaries of women teachers; total under instruction; wages of janitors; repair of buildings and up-keep of grounds; and total under maintenance. An analysis of these reports also shows that the larger communities are not much more likely to report expenditures for elementary- and high-school separately than are smaller communities, though there is a rather strong positive relationship between the size of the commu-

nities and the number of items reported by the city superintendents. Variability in the classification of identical items was frequently found. For example, one city reported express and freight under expense of child control; while two others report them as miscellaneous. One reported postage under expense of child control, another under miscellaneous, and a third under expense of instruction. One city reported expense for milk and under-nourished children as capital outlay; while another reported it under other expenses of general control. Evidently, no unit costs of accounting in one city can be compared with those of another where such variability of distribution exists.

Under the direction of Miss Sufinsky, assistant supervisor of English in Detroit, an experiment was conducted last year to show the results of experimental methods in developing literature appreciation. Ten schools in the experimental group were matched with ten others that formed a control group. The sixth grade only was used. Both groups took Form I of an appreciation test devised by Miss Sufinsky which consisted of seven versions of one story varying in degree of merit. Each pupil arranged the stories according to their appeal to him.

The teachers of the control group worked in their usual way; while those of the experimental group met, on an average, once in two weeks to discuss problems, exchange ideas, and unify the purpose of the experiment. In addition, members of the experimental group gave demonstrations for each other, and the supervisor held conferences with individuals and sent specific reference material for their direction. Form II of the appreciation test was given three months later when the experimental group showed an average median gain of 2.7, as against 1.7 gain by the control group.

A questionnaire calling for the following information was filled out by each pupil at the beginning and end of each experiment: Do you like stories? What kind do you like? Name several you enjoy. Do you like poetry? Name a poem you enjoy. Do you read magazines? If so, name them. Do you own books? If so, name one or more.

The stories, poems, and books were classified with the aid of four trained librarians as excellent, standard, mediocre, and of no value. Those designated standard and excellent were grouped together in contrast with those called mediocre or of no value. The following table presents the results in percent.

The table is read as follows: In the experimental group there was a three percent increase in the number of stories designated as liked which were classified as excellent or standard, and a 15 percent decrease in the number of those which were mediocre and of no value. A decrease in this type of story means improvement in literary appreciation. These results in the experimental group are contrasted with the 40 percent deterioration or decrease in the number of stories enjoyed by the control group which were of excellent and standard quality, and 15 percent increase in the number which were mediocre and of no value. The remainder of the table is read in the same manner. Among the eight possibilities there was but one case of deterioration in the experimental group (and that was small), as contrasted with five in the con-

LITERATURE APPRECIATION EXPERIMENT

Results in Percents

	Experimental Group		Control Group	
	Improvement	Deterioration	Improvement	Deterioration
Stories Enjoyed				
Excellent and Standard	3			40
Mediocre and Below	15			15
Favorite Poems				
Excellent and Good	6		26	
Mediocre and Below	65			737
Books Owned				
Excellent and Standard		5		16
Mediocre and Below	21		8	
Magazines Read				
Good	12		10	
Mediocre and Below	8			39

trol group, all of which were of considerable size one being overwhelmingly large. From these results it is apparent that supervisory effort which places material in the hands of the teachers and unifies activities and purposes in the direction of literary appreciation accomplishes the results desired.

Charlier's Control Checks on the Computation of the Standard Deviation and Coefficients of Correlation and Regression

It is the purpose of this note to call attention to some very simple and valuable control checks in computing the standard deviation and the coefficients of correlation and regression. While the underlying idea is familiar, nevertheless the method has not been explicitly used to any extent by American workers in our field so far as I am aware. This simple and elegant scheme is described by Charlier in his work, *Grunddragen af den mathematiska Statistiken*. For the statistician it is sufficient to characterize the method as consisting of a shift of origin and checking with the first origin without repeating the whole calculation. Because of the inaccessibility of Charlier's work for most readers, I shall explain the method in detail and give illustrative problems of application in the familiar notation.

The formula for the standard deviation of a series is,

$$(1)\quad \sigma = \sqrt{\frac{\Sigma x^2}{N}}$$

where x is the deviation of a measure from the mean i. e. $x = X - M$. Inasmuch as such deviations usually turn out to be decimals, it is customary to shift the origin, compute on integral values, and make subsequent corrections. Let ξ represent such a deviation from an assumed mean so that $x = X - M_x = \xi - M_\xi$ The formula for the standard deviation may then be written,

$$(2)\quad \sigma = \sqrt{\frac{\Sigma \xi^2}{N} - \left(\frac{\Sigma \xi}{N}\right)^2}$$

If the data are in a frequency distribution the expression becomes,

$$(3)\quad \sigma = \sqrt{\frac{\Sigma f\,\xi^2}{N} - \left(\frac{\Sigma f\,\xi}{N}\right)^2} \times \text{class interval}$$

Formulae (2) and (3) (really one) are the usual ones found in any text on statistical method.

Charlier's check makes use of the following relation:

$$(4)\quad \Sigma\,(\xi+1)^2 = \Sigma\,\xi^2 + 2\,\Sigma\,\xi + \Sigma\,1$$
$$= \Sigma\,\xi^2 + 2\,\Sigma\,\xi + N$$

For data in a distribution, this is written,

$$(4')\quad \Sigma f(\xi+1)^2 = \Sigma f\xi^2 + 2\,\Sigma f\xi + N$$

A numerical example follows to illustrate the procedure.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Value	Freq.	ξ	$f\xi$	$f\xi^2$	$\xi+1$	$(\xi+1)^2$	$f(\xi+1)^2$
95	1	6	6	36	7	49	49
90	2	5	10	50	6	36	72
85	2	4	8	32	5	25	50
80	3	3	9	27	4	16	48
75	13	2	26	52	3	9	117
70	26	1	26	26	2	4	104
65	26	0	..	..	1	1	26
60	17	-1	-17	17	0	..	..
55	8	-2	-16	32	-1	1	8
50	2	-3	- 6	18	-2	4	8
Totals...	100	..	46	290	..	..	482

From (3) $\sigma = \sqrt{2.90 - (.46)^2} = 1.64$ (class intervals)
$\therefore$ 8.2 in actual units.

The check may be indicated on the line of totals in the example, or as follows:

$$\Sigma f\xi^2 = 290$$
$$2\,\Sigma f\xi = 92$$
$$N = 100$$
$$\text{Sum} = 482 = \Sigma f(\xi+1)^2$$

From (4')

It will be noted that in columns 5, 6, and 7, we have begun to re-work the problem from a new origin, but that the complete re-working is cut short by Charlier's device, i. e., we do not need to obtain the total in column 5 and apply the correction to the total of column 7 as would ordinarily be necessary.

The formula for the correlation coefficient may be written,

$$(5)\quad r = \frac{\Sigma\,xy}{\sqrt{\Sigma\,x^2\,\Sigma\,y^2}}$$

If arbitrary origins are used and $x = \xi - M_\xi$ and $y = \eta - M_\eta$ the expression becomes,

$$(6)\quad r = \frac{\Sigma\,\xi\eta - N M_\xi M_\eta}{\sqrt{\left[\Sigma\,\xi^2 - N M_\xi^2\right]\left[\Sigma\,\eta^2 - N M_\eta^2\right]}}$$

which again is the familiar formula. To check the computation of r by Charlier's method, only one new expression is needed for the numerator:

$$(7)\quad \Sigma(\xi+1)(\eta+1)=\Sigma\xi\eta+\Sigma\xi+\Sigma\eta+N$$

Relations (4) and (7) then give complete checks on the arithmetic. An illustrative problem follows:

X	Y	ξ	η	ξ^2	η^2	$\xi\eta$	$\xi+1$	$\eta+1$	$(\xi+1)^2$	$(\eta+1)^2$	$(\xi+1)(\eta+1)$
1	3	-2	-1	4	1	2	-1	0	1	0	0
2	1	-1	-3	1	9	3	0	-2	0	4	0
3	2	0	-2	0	4	0	1	-1	1	1	-1
4	4	1	0	1	0	0	2	1	4	1	2
6	8	3	4	9	16	12	4	5	16	25	20
N=5		5)1	5)-2	15	30	17		NM_ξ^2	22	31	21

$M_\xi = 0.2$ $M_\eta = -0.4$

Whence $NM_\xi^2 = 0.2$, $NM_\eta^2 = 0.8$, $NM_\xi M_\eta = -0.4$

and, from (6) $r = \sqrt{\dfrac{17-(-0.4)}{(15-0.2)(30-0.8)}} = \sqrt{\dfrac{17.4}{14.8\times 29.2}} = +0.84$

Control Checks

$\Sigma\xi^2 = 15$	$\Sigma\eta^2 = 30$	$\Sigma\xi\eta = 17$
$2\Sigma\xi = 2$	$2\Sigma\eta = -4$	$\Sigma\xi = 1$
$N = 5$	$N = 5$	$\Sigma\eta = -2$
		$N = 5$
Sum $= 22 = \Sigma(\xi+1)^2$	Sum $= 31 = \Sigma(\eta+1)^2$	Sum $= 21 = \Sigma(\xi+1)(\eta+1)$

It is further evident that the relationships (4) and (7) also furnish checks on the computation of the two regression coefficients, written in the form,

$$b_{1.2} = \frac{\Sigma\xi\eta - NM_\xi M_\eta}{\Sigma\eta^2 - NM_\eta^2} \qquad b_{1.2} = \frac{\Sigma\xi\eta - NM_\xi M_\eta}{\Sigma\xi^2 - NM_\xi^2}$$

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(HARRY A. GREENE, *Secretary and Editor*)

HIGH-SCHOOL CONTEST IN SCHOLARSHIP AT WESTERN STATE COLLEGE, GUNNISON, COLORADO

Communicated by H. T. Manuel, Director of Educational Research

A high-school scholarship contest conducted along the general lines of a track and field meet was conducted by Western State College, Gunnison, Colorado, at the end of the past school year. The contest was open to all high schools in the state. A cup was given to the school winning the most points, and medals were provided for individual point winners. The two high-school seniors receiving the greatest number of points were given scholarships.

The plan allowed a high school to be represented by a team consisting of any number from one to seven. An individual was permitted to enter more than one contest if he was eligible and if no one else represented his school in these events. In general the teams were expected to consist of:

1. One Freshman in algebra.
2. One Freshman in Latin I.
3. One Junior or Senior in American history or civics.
4. One Junior or Senior in physics.
5. One student from any class in typewriting.
6. One student from any class in correct English.
7. One to three students from any class in general information. (Only one new student who has not appeared in one of the preceding tests can enter this one.)

The contest was planned to consist of examinations built upon the pattern of standard tests. This fact assured an interesting examination with a minimum of writing. To be eligible to the contest a student must be under 21 years of age and must not have attended high school more than four years.

The following is a brief description of the several examinations:

Algebra I.—Open to one student from each high school who has not attended high school before the present year. Includes topics of beginning algebra to, but not including, quadratic equations.

Latin I.—Open to one student from each high school who has not attended high school before the present year. Includes grammar, translation, paradigms, and vocabulary of first-year Latin.

American history and civics.—Open to one student from each high school who is in the third or fourth year of his attendance in high school. Includes American history from 1760; the present government of the United States, Colorado, and local political units.

Physics.—Open to one student from each high school who is in the third or fourth year of his attendance in high school. Includes all topics usually taught in high schools, omitting the most difficult mathematical problems.

Typewriting.—Open to one student from each high school who has not attended high school for more than four years. Each contestant must furnish his own machine. Any standard make will be allowed. Consists of writing from specified copy. Shorthand is not required.

Correct English.—Open to one student from each high school who has not attended high school for more than four years. Includes ability to use correct and forceful English and to punctuate and capitalize correctly. The writing of rules is not called for. A short news story will be written, the facts for which will be furnished at the time of the examination.

General information (relay).—Open to any who took part in any other test and to one additional student from each school who has not attended high school for more than four years; provided, however, that each school shall not be represented by more than three students. Includes information in algebra, geometry, Latin, French, Spanish, chemistry, physics, biology, geography, agriculture, business, manual training, English literature, home economics, general and American history, music, drawing, and current events. It is not expected, of course, that any one student will have studied all these subjects; but the examination includes facts from all, to balance differences in the training of different students.

MINNESOTA SOCIETY FOR STUDY OF EDUCATION

A communication submitted by Dr. Leo J. Brueckner calls attention to the fact that on March 26, 1923, a group of forty interested students of education met and organized a society for the study of educational problems. A constitution was proposed and adopted. Dr. M. E. Haggerty, dean of the College of Education, University of Minnesota, was elected president, and Dr. Leo. J. Brueckner, also of the College of Education, University of Minnesota, was elected secretary-treasurer.

The purposes of this new organization, as developed in the preliminary discussion and in the statement submitted by the secretary are as follows:

1. A forum for discussions—the desirable stimulation arising from exchange of opinion, criticism of methods, etc.
2. Cooperative studies—an organization to facilitate the promotion of investigations in which large numbers of persons participate.
3. Publications—the value of research is accentuated if publication of results is made easy and prompt.
4. Public interest—the development of an intelligent public interest and an appreciation of the results of educational investigations.

The following outline is indicative of the classification of research work undertaken in connection with the preliminary survey conducted by the special committee appointed for the purpose.

Types of Studies

I. Administrative Research
  A. Pupil Accounting
    1. Age-grade
    2. Grade-progress
    3. Absence, tardiness, etc.
    4. Failure
    5. Reclassification on basis of
      a. Group intelligence tests
      b. Individual intelligence tests
      c. Achievement tests

B. Financial Studies
1. Comparative cost studies, tax rates, etc.
2. Cost per subject
3. Cost per classes of schools
4. Budget
5. Building
6. Salary schedules

C. Buildings
1. Survey of present buildings
2. Location of prospective buildings
3. Adjustment of buildings.
4. Operation of plant
5. Survey to determine future needs

II. Instructional Research

A. Curriculum and Courses of Study
1. Survey of needs of community
2. Preparation of new courses of study
3. Comparative studies of courses
4. Evaluating courses
5. Adjustment of pupils of varying ability

B. Teacher training
1. Seminars
2. Bulletins
3. Special reports
4. Demonstration lessons

C. Supplies and Materials of Instruction
1. Surveys of textbooks, distribution, etc.
2. Standardization of materials of instruction
3. Standardization of supplies on same basis
4. Standardization of requisitions

D. Following up a testing program
1. By subject
2. Procedure worked out

III. Tests and Measurements

A. Intelligence Tests
1. Relation of intelligence to school progress
2. Relation of intelligence to skipping
3. As a basis for reclassification or grouping
4. What tests?

	Name of Test	Grades
a. Group		
b. Individual		

B. Achievement Tests

	Name of Test	Grades
1. Reading		
2. Arithmetic		
3. Spelling		
4. Writing		
5. Other subjects		

IV. Special Experiments and Investigations

COOPERATIVE TESTING PROGRAM IN COUNTY NORMAL SCHOOLS

In cooperation with the State Department, Dr. E. J. Ashbaugh, Assistant Director of the Bureau of Educational Research, Ohio State University, conducted an extensive testing program covering the county normals of the state during the past year. The following tests were used: Kirby Grammar; Thorndike-McCall Reading; Buckingham Problems in Arithmetic; Barr U. S. History; Buckingham-Stevenson Geography. A great deal of interest was shown by the County Normal schools. It is hoped by those responsible that the results of this testing program may prove to be so valuable that a similar program may be inaugurated in the State Normal Schools.

DR. HOLLINGSWORTH ASSISTS IN ORGANIZING EXPERIMENTAL SCHOOL

In February, 1923, Dr. Leta S. Hollingsworth, of Teachers College, went to Harrisburg to assist in the selection of pupils for the new experimental school, which has been established there by Mrs. Gifford Pinchot, wife of the Governor of Pennsylvania. The new school will be under the direction of Miss Elizabeth Lavelle, formerly a student of education at Teachers College. The pupils were chosen from the public schools of Harrisburg, on merit, by the use of objective tests, both of endowment and of achievement.

Mrs. Pinchot has for many years been actively interested in education, and it is intended to utilize scientific knowledge of child psychology, and to exemplify progressive ideals, in the conduct of this school.

OHIO STATE UNIVERSITY
COLLEGE of EDUCATION

Announcements 1923-24

THE QUARTER SYSTEM

Under the quarter system, the work of the school year is divided into smaller units than formerly. This enables the individual more readily to adjust his personal plans to the University schedule. Students may register, for any quarter, during the quarter preceding. Degrees are conferred at the end of every quarter.

The dates of the quarters during 1923-24 are as follows: Summer Quarter began June 18, ended September 1 (Was divided into two terms of six weeks each); Autumn Quarter begins October 1, ends December 22, 1923; Winter Quarter begins January 2, ends March 15, 1924; Spring Quarter begins March 24, ends June 10, 1924.

AUGMENTED FACULTY

The College of Education has made substantial additions to its faculty for 1923-24. These include ten new teaching members exclusive of extra personnel serving in the Summer Quarter only. These acquisitions enable the College to offer a more diversified list of courses.

CURRICULA

The College of Education offers general curricula for the preparation of public school teachers of all the standard academic subjects. It also offers special curricula in Fine Arts, Home Economics and Industrial Education (including Manual Training).

NEW CURRICULA

Beginning with 1923-24, the College of Education offers new curricula as follows:

Curriculum in Vocational Education.
" " Physical Education.
" for Commercial Teachers.
" " Teachers, Supervisors, and Principals in Elementary Schools.
" " School Nurses and Teachers in Schools of Nursing.

DEGREES AND CERTIFICATES

All of the above mentioned curricula require four years for completion and lead to the degree, Bachelor of Science in Education, and the appropriate state certificate or certificates.

OTHER SPECIAL FEATURES

Appointment Committee, Psychological Clinic, Bureau of Educational Research, new Division of Elementary and Rural Education.

OPPORTUNITIES FOR GRADUATE WORK

Facilities for graduate work in Education have been considerably enlarged, as evidenced by the fact that the professional departments of the college will offer during the Autumn, Winter and Spring Quarters, a total of 136 courses open for graduate credit. In addition to classroom courses, good opportunities for directed individual study and research are now made available by the departments of History of Education, Principles and Practice of Education, Psychology, School Administration and Vocational Education. In this connection graduate students will find the Bureau of Educational Research a valuable source of help.

For additional information address

COLLEGE OF EDUCATION
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